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OCTOBER 2003

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Tested: 12 SOHO colour laser printers PAGE 113

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Simple Knoppix 3.2 setup guide PAGE 134

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Keep your hard drive free of junk and debris.

3 Globex 1.51
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PLUS
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GAME DEMOS
After 20 years since the original, Tron 2.0 is here. This latest demo features single player, multiplayer and light cycle options. Plus World Cup Rugby 2004, the challenging puzzle game of Qbz and board game Billionaire II.

For contents & instructions, see page 8.

PAGE 42 **Windows tweaks**
Registry fixes for pros and newbies alike

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Basic tools for PC tasks

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New tools and software to tame your in-box

PAGE 87 **35 Best Buys**
Widescreen Notebooks
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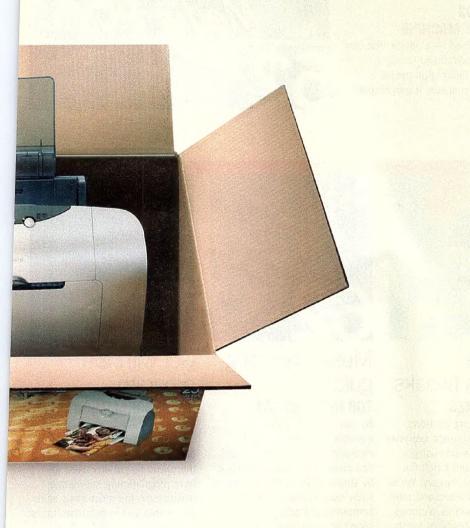W5 Group ACE254/PCW

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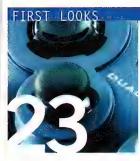
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PC World and Seagate are giving away seven Barracuda 7200.7 160GB Hard Disc Drives — valued at $370 each!

COMING UP IN THE NOVEMBER ISSUE:
- Second annual buying guide: essential reading for tech shoppers
- Fast fab upgrades: get a new power PC in an hour— or less
- PDA software: software to make a handheld your new best friend
- Web and you: tips to beat the broadband blues
- Test centre: graphics cards

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Safely back up your data files and settings with this essential program.

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Keep your hard drive free of junk and debris.

3 Globex 1.51

The perfect travel companion: includes a currency converter, world clock and country telephone code list.

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GAME DEMOS

- Tron 2.0 (features single player, multiplayer and light cycle options)
- World Cup Rugby 2004
- Qbz
- Billionaire II

FEATURES

- DarkBasic Professional 3
- Fresh UI 6.2
- LCC-Win32
- Script-enable file: mse.reg
- mkwACT
- Ogg Drop
- PowerStrip 3.1
- Registry First Aid 3
- Registry Mechanic 2.01
- Registry tweaks and tools
- SnapStream Personal Video Station
- Windows Media Encoder 9
- WinDVR3
- Xteq X-Setup 6.3

PATCHES

Internet Explorer 6 SP1 Cumulative Update (Q818529), Java Virtual Machine 3810, Nero 6.0.0.11, Mouseware 9.78, Paint Shop Pro 8.01 update.

HELPSCREEN

- Kerio Personal Firewall 2
- Myalert 4
- Apache 1.3.28
- PHP 4.3.2
- PHP file
- TuffTest
- TuffTest lite 1.53

ESSENTIALS

Acrobat Reader 6, Ad-aware 6, DirectX 9.0b, DivX 5.05, MusicMatch 8, Visual Basic Runtime Files, Winamp 3, WinZip 8.1 SR-1.

BROWSERS

Internet Explorer 6 SP1 (includes Outlook Express 6, Media Player and other add-ons), Mozilla 1.4.

CD 2

KNOPPIX 3.2

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- KOffice 1.2.1

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Using the CD

The PC World CD will load automatically if you have Windows and a Web browser installed. If you have Linux or BeOS and a Web browser installed, load index.htm from the root directory on the CD. For more information about how to use the CD, see the read–me.txt file in the root directory (d:/read–me.txt, where d: is your CD drive).

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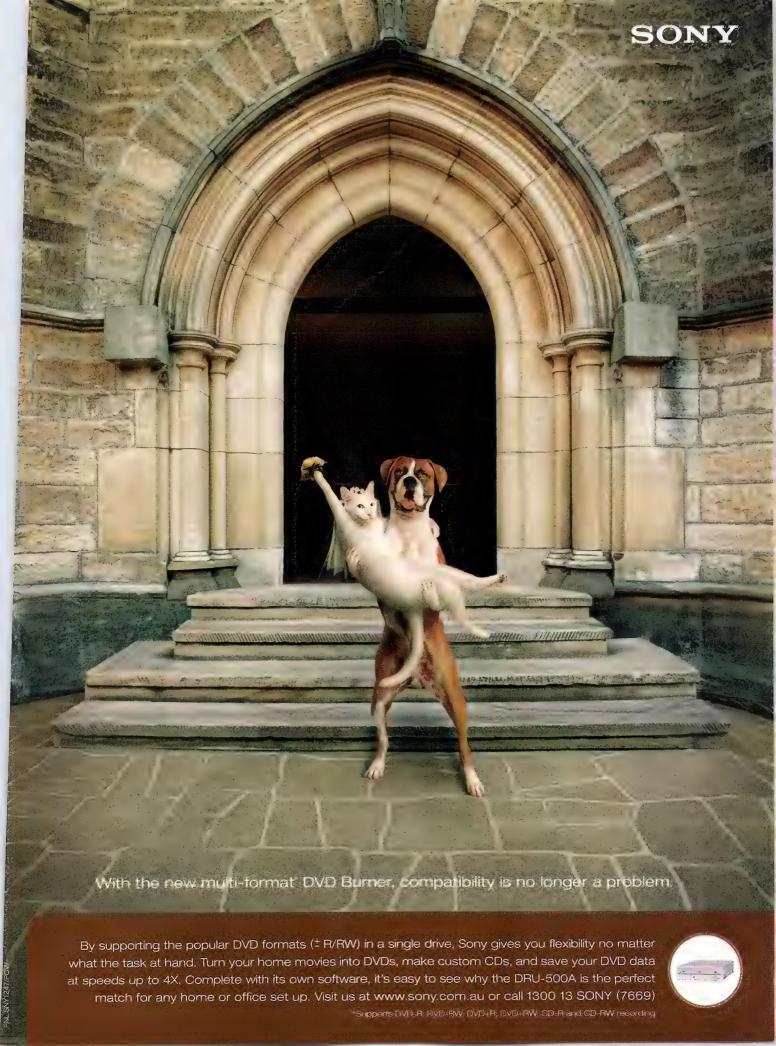
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Technical support & product registration

The programs on this CD are supplied "as is" from the software vendors. If you are having any difficulties using a particular program on this CD, please contact the software vendor or author. PC World cannot supply technical support, training, registration numbers or passwords for any of the programs on this CD. If the CD is damaged, we will replace it free of charge — see Damaged CDs (above) for more details.

Viruses

The PC World CD is scanned for viruses. Machines used for producing the CDs are also monitored for unusual behaviour. However, it is highly recommended that you check each CD for viruses. If you wish to stop the CD's autorun file from starting so you can check for viruses before launching it, then hold the shift key down while inserting the CD into your PC.

EDITORIAL

50,078
December 2002
(Average paid circulation)

Roy Morgan Readership:
281,000
(July 02-June 03)

What a blast!

Windows XP has been spruiked as an easy-to-use OS for all. In the wake of the recent wide spread of Internet worms, Microsoft has finally realised that it needs an easy and pain-free way to deliver critical updates in order to encourage people to secure their PCs.

The assault on your PC went up a notch recently following the Blaster worm, which spread at the speed of wildfire, quickly followed by the virulent Sobig.F virus. Even if you battened down your Internet hatches, you were likely to be caught in the cross-fire as these attacks generated a sizeable amount of traffic around the globe.

At press time, Telstra's corporate affairs spokesperson Stuart Gray said the Sobig.F worm reached its peak in terms of activity on the Telstra network on 22 August. Of the 16,500 virus-infected e-mail messages reported at the Telstra network firewall that day, 15,170 were infected by the Sobig.F worm.

This figure was up from 13,300 Sobig.F-infected e-mail messages recorded on the previous day, and represented over 10,000 more than the average 1000 to 2000 viruses which hit the telco's firewall on a daily basis, Gray said.

Gray believes the Sobig.F variant is the "biggest and fastest acting virus this year".

On 16 July — four weeks prior to the attacks commencing — Microsoft issued a critical security update that fixed a serious security vulnerability in Windows. And although the company urged customers to patch up, many apparently ignored the warning. As such, the Blaster worm that started spreading weeks later was able to infect hundreds of thousands of computers by taking advantage of the vulnerability.

Interestingly, in Japan the weekend after the Blaster worm hit, Microsoft produced and distributed 200,000 compact discs as part of its efforts to stop the worm.

Traditionally, Microsoft delivers software patches through its Windows Update Web site and through update software in Windows XP, Windows 2000 and Windows Me. The software does not download and install patches by default, but asks a user to select from various options, including just alerts when an update is available.

The reason for the sudden CD production in Japan was that the company received a lot of requests from narrowband users and people who didn't understand downloading.

In response to the many reader requests, PC World again contacted Microsoft Australia to canvas the possibility of supplying its security updates and patches for distribution on our cover CDs, available to our 281,000 readers every month. If you consider when Microsoft issued the patch, PC World could have probably included the Blaster patch on its September issue. At this stage, Microsoft locally appreciates the feedback we have given them on this matter, and has again raised this issue with the US head office. Microsoft Australia agrees that it needs to improve the service pack communication to customers who have a 56Kbps dial up. Maybe this blast will put a firecracker under them! ■

AMANDA CONROY, EDITOR

Microsoft ordered to pay up in patent dispute

A US jury has ordered Microsoft to pay $US520.6 million in damages to a technology company and the University of California after finding that Microsoft's Web browser infringed on a patent.

In the case, Eolas Technologies and the university accused Microsoft of improperly including technology in Internet Explorer that allows interactive content to be embedded in a Web site.

The University of California was issued a patent in November 1998 based on work completed by researcher Michael Doyle, who went on to found Eolas. Doyle is also the company's chief executive officer. Eolas has exclusive rights to use and license the patent, according to the University of California statement.

The patented technology for embedding interactive elements is a key component of the Internet experience today, the university said. It is often used, for example, with video players, virtual tours, games and stock information, according to the university.

Iomega develops 1.5GB mini disk

Iomega has developed a new magnetic storage disk for use in portable multimedia devices, which is the size of a large coin and can store 1.5GB of data.

The Digital Capture Technology (DCT) system is still in the prototype stage and Iomega isn't planning on launching the first products until at least the second quarter of next year. When it is launched, the company hopes the removable DCT disk, with its associated drive, will find favour among device manufacturers who are looking for an alternative to solid-state memory storage.

One of its biggest selling points is price: Iomega estimates a DCT disk will cost around $US10. Removable memory cards currently cost between $US175 and $US400 for 1GB of capacity, and even with price reductions over the next year are still likely to cost several times more than a DCT disk at the time of the scheduled launch.

Compared to other disk systems it is also physically smaller and weighs 9g. Iomega says they are aimed at use in devices such as camcorders, Tablet PCs and personal video recorders. ■

Long wait for Longhorn

BY JORIS EVERS

Longhorn, the next major release of Windows, is "a bit scary", Microsoft chairman and chief software architect Bill Gates said recently. Scary to computer users, that is, because Longhorn products will be very different from today's Microsoft software, he said. But it appears the software is also causing some shivers at Microsoft.

Microsoft last year said Longhorn would be just another Windows client. However, it is now clear that the software stable is breeding a whole herd of long-horned cattle with a dose of .NET hormones.

The operating system will have a new file system and come out in client and server versions. Around the same time, Microsoft will release Longhorn versions of the Office System applications, Visual Studio developer tool and Microsoft Business Solutions products.

Longhorn will have a "unified file system" called Windows File System, or WinFS, that will have "Web services as sort of a built-in piece," Gates said. The file system will be based on technology from the next version of Microsoft's SQL Server database, codenamed Yukon, which is due out by the end of next year. As one of its advances, WinFS is expected to let users view files indexed from various physical locations on a drive instead of displaying the contents of folders or directories.

Though a bit more open than before about its plan for a "big bang" release of new technology and multiple products with Longhorn, Microsoft has been quiet when it comes to shipping dates. The company distanced itself from a commitment it made in May to deliver Longhorn in 2005. "We don't know the exact timeframe of it. It's clearly many years of work that we're engaging in," Gates said.

With Windows XP out since October 2001, PC vendors are pushing for a quick release of Longhorn to drive sales. However, Windows Server users just got Windows Server 2003 in April and don't want another upgrade for at least three years. Microsoft is planning updates of Windows XP Tablet PC Edition and Windows XP Media Center Edition to appease the PC vendors.

Be afraid: Microsoft is planning big changes with its next Windows update, Longhorn, which is just moving beyond concept stage.

Longhorn appears to be a second attempt to get .NET off the ground after its initial grand launch three years ago. This time it may be for real, said Rob Helm, research director at Directions on Microsoft, an independent research firm.

"Microsoft said .NET was a big bet, but .NET fizzled without wiping out the company. Longhorn is when .NET finally becomes a big bet," he said. "No machine on the desktop today comes with the .NET framework. That will change with Longhorn. Suddenly every machine that ships with Windows will have the .NET developer technology built in."

.NET is Microsoft's technology that uses standard technologies such as SOAP (simple object access protocol) and XML (extensible markup language) to link applications over the Internet and create Web services.

No set plans

Longhorn is just moving beyond the concept stage and the plans for its future are not set.

"With Longhorn, it seems to shift from one conference to the next," Helm said, referring to Microsoft's Windows Hardware Engineering Conference (WinHEC) in May where the company set 2005 as the year for Longhorn and said there would not be a new file system.

Joe Wilcox, a Jupiter Research senior analyst, agreed that Microsoft's Longhorn plans are still in flux. "It is very clear still that there are a lot of question marks at Microsoft as to what is going to happen with Longhorn," he said. ■

Security boost for IM

BY JORIS EVERS

Zone Labs is jumping into the instant messaging (IM) security fray, but unlike most vendors Zone Labs will first target consumers and wants to secure IM on the desktop instead of the server.

The company, known for its ZoneAlarm firewall, has announced IMsecure Pro 1.0, its first step into the fledgling market for IM security. The initial product is meant for consumers and small businesses. Expansion to the enterprise arena is planned for later this year, said Fred Felman, vice president of marketing at Zone Labs.

Installed on the PC, IMsecure Pro sits between a user's IM client and the public messaging networks. It scans IM traffic and blocks malicious code and spam. The product also encrypts messages sent between IMsecure users and allows users to set rules on outgoing messages and block features such as file transfers and voice and video chats, Zone Labs said.

IMsecure Pro supports the IM networks used by Yahoo's Messenger, Microsoft's MSN Messenger and AOL Instant Messenger, Felman said. Any client that sends messages across any of these three networks is supported, including IM consolidators such as Trillian and EasyMessage, he said.

IMsecure Pro costs $US19.95. A free, dressed-down version of the product for personal and nonprofit users is also available.

Although there have been few high-profile attacks using IM, and the amount of spam on the networks is limited, the use of public IM networks poses a security threat, especially in businesses, said Pete Lindstrom, research director at Spire Security.

"I would expect the viruses and worms will heat up, but right now I don't see them as a huge issue. Right now it comes to rogue applications, network usage and securing confidential information," Lindstrom said. ■

4GB CF card launched

BY MARTYN WILLIAMS

Lexar Media has begun shipping a 4GB CompactFlash card. It's the largest-capacity flash memory card of any format currently available, but comes with some potential compatibility problems.

One of the problems lies in the physical size of the Lexar card. It is a type 2 CompactFlash card and as such is about 2mm thicker than the standard type 1 card.

Many current and previous products only support the FAT16 file system, which uses 16-bit addresses to access data on the disc; that means there are enough addresses for up to 2GB of data. To access over 2GB of storage space, devices need to support the FAT32 file system. Lexar has set up a Web page (**www.lexarmedia.com/FAT32**) to list compatible products and it currently carries the names of 11 cameras.

The problems don't end there. Lexar notes that some cameras which support FAT32 will still use the FAT16 file system to format an unformatted card. In this case the company is supplying an application to enable users to format their cards with FAT32. Writing with FAT32 may also take longer, said Lexar.

SanDisk, one of Lexar's competitors, is planning to ship its own 4GB card in a type 1 package sometime in the fourth quarter of this year, said Bob Goligoski, a spokesman for SanDisk. While this card will be physically compatible with all products, they will still need to support the FAT32 file system to access the full storage space.

The Lexar card costs around $US1500. SanDisk says its card will cost around $US1000 when it becomes available. ■

Lexar Media's 4GB CompactFlash card can store more than 45,000 JPEG images in consumer cameras.

Company claims lightest MP3 player yet

A South Korean company has developed what is one of the smallest and lightest MP3 players to date.

The circular EMP-Z is 42mm in diameter, 10mm thick and weighs a scant 15g. Its size means that the device is small enough and light enough to be attached to a chain and worn around the neck as a pendant.

The player was co-developed by two South Korean electronics companies, EraTech and Station Z. Two versions of the EMP-Z are available. One contains 128MB of memory, or about enough space for 30 to 40 average MP3 files, while the second version contains double the amount of memory. To keep the size small, a memory card slot was not built into the product.

The player runs on a coin-type Lithium Ion rechargeable battery and EraTech says a full charge provides enough power for about eight hours of use.

The 128MB model is expected to have a retail price of around $US120. Availability around the world will be determined by retailers and OEM manufacturers who will rebadge the product.

ACCC support of chipping labelled 'ludicrous'

Sony Australia managing director, Michael Ephraim, has taken a swipe at the Australian Competition and Consumer Commission (ACCC) after the government's consumer watchdog expressed disappointment following a court decision to ban the sale of console modification chips.

The Full Federal Court decision in the case of SCE versus Sydney retailer Eddy Stevens means it is now illegal to sell modification chips in Australia although, unlike the US, it is still legal to own one.

"Chipping has allowed consumers to modify their PlayStation consoles to play imported and backup copies of games," said ACCC chairman Graeme Samuel. "The ACCC believes region coding is detrimental to consumers as it severely limits their choice and, in some cases, access to competitively priced goods."

Ephraim said that chipping was already illegal in the US and the UK and claimed the court's decision had merely brought Australia "in line with the rest of the modernised Western world". ■

Why there are two types of Tecra equipped with Intel® Centrino™ mobile technology.

TECRA M1: *INTEL® CENTRINO™ MOBILE TECHNOLOGY: Intel® Pentium® M Processor 1.60GHz; Intel® PRO /Wireless Network Connection 802.11b; Intel® 855M Chipset Family/60GB HDD/DVD-CDRW/512MB RAM/14.1"XGA TFT screen/Bluetooth/Gigabit Ethernet/and more.*

TECRA S1: *INTEL® CENTRINO™ MOBILE TECHNOLOGY: Intel® Pentium® M Processor 1.60GHz; Intel® PRO/Wireless Network Connection 802.11b; Intel® 855M Chipset Family/60GB HDD/DVD multi-drive/512MB RAM/15" UXGA TFT screen/ATI Mobility™ Radeon™ 9000 graphics controller/and more.*

OBSERVATION: Large organisations migrating to Intel's new chip-set need to bear in mind not only their corporate needs, but also the varied roles of their people.

OBJECTIVE: Provide all the business benefits of Tecra (long life-cycle, platform stability, low total cost of ownership) in two different forms, each matched to a particular workstyle.

RESULT A: The Tecra M1 with Intel® Centrino™ mobile technology. Designed for employees who spend more time interstate or overseas than in the office. It's powerful and fully featured (see specs), yet it weighs just 2.7kg. It can run for 6 hours or more on the primary battery (10+ with the optional SelectBay battery)* It's wireless. It's the tool for those called on to work anywhere at anytime.

RESULT B: The Tecra S1 with Intel® Centrino™ mobile technology. Designed for employees who work in the corridors of power. It's a fully featured desktop replacement (see specs). It has a 15" screen and a long battery life. It's wireless. It's the tool for those who do back-to-back meetings and big presentations, run demanding applications, and need to stay connected whatever room they're in or floor they're on.

ACTION: See your nearest Toshiba Authorised Reseller, visit www.isd.toshiba.com.au or call 13 30 70 for more information.

May vary depending on configuration, applications, power management settings and features utilised.

TOSHIBA

JB TSH50053-5R

Easier Linux battles XP

BY JOHN BLAU

Linux, once viewed as an operating system only geeks could appreciate, is today a much more user-friendly software that companies, public administrations and consumers can master almost as easily as Microsoft's Windows XP. That's the finding of a study published by Relevantive, a Berlin-based firm specialising in consulting on the usability of software and Web services.

The study focuses on the use of Linux in companies and public administrations, using SuSE Linux AG's Linux Professional 8.2 with the KDE 3.1.2 graphical interface.

The researchers studied how easily two groups of users could perform tasks using the different operating systems. One group consisted of 60 users between 25 and 55

A new study using SuSE Linux Professional suggests Linux could be just as easy to use as XP.

with computer skills but no prior experience with Linux or Windows XP. They tested the preconfigured open source software according to various criteria, such as the ease of creating and administrating new and existing files, copying CDs, and performing some basic office tasks.

The other group consisted of 20 users with the same qualifications who performed exactly the same tasks on Windows XP.

Linux users needed 44.5 minutes to perform a set of tasks, compared to 41.2 minutes required by the XP users. Of the Linux users, 80 per cent believed that they needed only one week to become as competent with the new system as with their existing one, compared to 85 per cent of the XP users.

But when it comes to the interface and program design, Windows XP still has a strong edge: 83 per cent of the Linux users said they liked the design of the desktop and the programs, compared to 100 per cent of the Windows XP users. ∎

Telstra's Wi-Fi assault

BY NADIA CAMERON

Throwing its weight behind the increasingly popular wireless broadband movement, Telstra has launched its first national Wi-Fi service.

Telstra Wireless Hotspots are now operating in 17 locations across the country, including Qantas Club lounges and Rydges Hotels and Resorts. Telstra is also finalising an agreement to roll out hotspots in McDonald's restaurants, and will launch hotspots in Hilton Hotels shortly.

The Telstra hotspots are based on the 802.11b standard, also referred to as Wi-Fi, and offer users an average download speed of 1Mbps.

Telstra group managing director, consumer and marketing, Ted Pretty, said the Telstra wireless service would be complementary to the telco's fixed broadband products, and supplement

voice and data services across its mobile networks.

"We're concentrating on high brand, high volume locations," he said. "We want to capture the key market for Wi-Fi activity." Users will have the option of either paying for access to the service via their mobile phone bills (post-paid), or on a casual, pay-as-you-go basis.

Telstra mobile post-paid customers will be charged $5 for the first 15 minutes of use, with additional usage charged at $0.20 per minute. To log in, post-paid customers will need to use a fresh password for each wireless session, sent to them via a text SMS.

Customers who opt to pay for casual use by credit card upon entering a Hotspot will also be charged $5 for the first minutes, then $3 for each 15-minute block thereafter. ∎

Real to build open media player

RealNetworks is launching a project to build an open source media player, offering to give Linux, UNIX and Solaris users the same media playback and support capabilities available from the company's RealOne Player for Windows and Mac systems.

The project will be taken on by the Helix community of developers. Real introduced Helix last year as both a community and platform for the standardisation of digital media. Since then, it has released source code for the server, client and producer portions of its media delivery system.

With Helix, Real is aiming to propagate the use of a multiformat system rather than a proprietary approach like that taken by Microsoft with its Windows Media format.

The open source player will be built on top of the cross-platform media engine Helix DNA client, the company said, and will have binaries for RealAudio and RealVideo. Initial versions of the player will be built for the open source Linux OS and for Solaris, Sun Microsystem's version of UNIX, Real said.
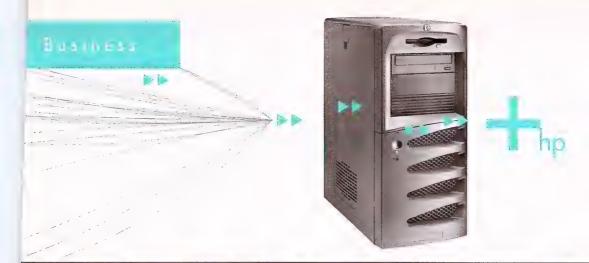
AMD demos Alchemy-based PDA

Chip maker AMD has recently been showing off a reference design for a PDA based on its Alchemy Au1100 processor running Linux.

The Au1100-based PDA reference design runs Metrowerks's Linux-based OpenPDA suite of software. OpenPDA includes an embedded Linux kernel and a range of software designed for use in PDAs, including games and software for playing music and video files, as well as Trolltech AS's Qtopia multilingual user interface, Opera Software ASA's Opera Web browser, and support for both Personal Java and J2ME (Java 2 Platform Micro Edition).

OpenPDA also includes a suite of personal productivity applications, including a calendar, contact management, to-do list, e-mail client and a text editor.

The chip is available in three versions, running at clock speeds of 333MHz, 400MHz and 500MHz, and includes an MIPS32 processor core, an on-chip LCD (liquid crystal display) controller, a 10/100 Ethernet controller and a USB device and host controller. ∎

BROADBAND
Consumers are confused

BY NADIA CAMERON

Broadband service providers should take more responsibility for educating customers about the specifications of broadband products, industry representatives claim.

Representatives from several service providers agree that although industry watchdogs provide consumers with plenty of avenues for pursuing concerns over broadband services, it is ultimately the ISP's role to assist consumers with understanding the technology.

"The onus is on the ISP to be transparent and fair," Pacific Internet managing director Dennis Muscat said. The comment follows the release of a report commissioned by the ACA examining consumer issues with broadband.

Drafted for the ACA by consultancy group dandolopartners, the report was based on two ACA workshops held in Sydney and Melbourne in June.

At the top of the report's list of consumer issues is the confusion created by the marketing message, speed and download limits promised by broadband service providers.

"In the context of limited knowledge the tendency to market broadband on the basis of simple promises such as broadband being very fast or 'always on' can lead to disillusionment when they are not borne out in the reality of the product or customer contracts," the report states.

In addition, "customers are not made clearly aware that there may be limitations on availability of the speeds promised, that the advertised speeds are usually maximums or based on 'best endeavours' rather than guarantees."

The report recommends ISPs produce basic types of information for consumers using standardised characteristics in a comparable "checklist" form. These could include costs per megabyte, average access speeds, average of monthly downtimes based on past network performance, limitations on the service, compatibility issues and installation costs.

Keep it simple

Pacific Internet's Muscat said it was important for ISPs to provide consumers with simplified information on their broadband product offerings.

"Excess usage clauses should not be buried on page 43 of the contract," he said. "ISPs should highlight 'headline' items."

But Muscat disagreed with the need for introducing standardised types of information across all broadband providers, saying this could cause more confusion.

In contrast, Request general manager for product development Gary McLaren, who is a regulatory and ACIF working committee member, said a number of key parameters for broadband services should be defined and provided by ISPs to all prospective customers via a service definition framework.

One example of such a parameter, which Request has recommended to the ACA, is an "oversubscription ratio". This would require all service providers to disclose how many of their customers share the equivalent amount of bandwidth being sold to each individual customer.

Internode's Simon Hackett said contention ratio information might look helpful initially, but was wary that such data could be misleading for consumers.

"There was a similar process attempted by the ACA in the dial-up Internet access realm some months back, which essentially foundered for this reason. There was a tendency to focus on the potential to report performance measures which might sound helpful but aren't — 'dial-up contention ratios' being one of them," he said.

"It's the old adage yet again: 'good, fast, cheap — pick any two'. And as always in this industry, there is no problem as long as the customer knows which two they have chosen." ■

PROBLEMS FOR BROADBAND CONSUMERS:
- Inability to compare services
- Difficulties with jargon
- Concerns over performance compared to promises
- Lack of information on restrictions
- Difficulty finding what's available for a location
- Potential for hidden costs
- Uncertainty about bills

As identified by dandolopartners for the ACA (**www.aca.gov.au**).

BROADBAND BRIEFS

Small businesses jump at broadband

Around 41 per cent of Australia's small businesses are connected to the Internet via a broadband connection, a new report claims.

Pacific Internet's inaugural Barometer Business Broadband Report, released in July, found approximately 206,000 Australian small businesses had online access using broadband technologies.

While the most recent Australian Competition Consumer Commission (ACCC) report recorded only 75,000 Australian businesses with a broadband connection, Pacific Internet chief Dennis Muscat said such figures do not take into account businesses which use residential broadband products and plans to run their business.

DSL technologies (including ADSL) proved to be the most popular broadband solution, with 25 per cent of the respondents stating they used DSL for online access. 15 per cent of businesses said they used cable technologies.

The quarterly survey was conducted by ACNielsen Consult and was based on responses from 1167 Australian small businesses with fewer than 50 employees. Broadband was defined as services with an access speed of 256Kbps or greater.

BigPond pushes ISDN as ADSL alternative

Telstra BigPond has unveiled a new ISDN home product as an alternative for those who can't get ADSL.

The new volume-based BigPond ISDN plan gives consumers access to both 128Kbps download and upload speeds across their existing copper line for a monthly fee of $39.45. It includes 500MB of downloads per month, with excess usage charged at 16.9 cents per megabyte.

Telstra said the ISDN plan compares favourably with BigPond's ADSL plans, which start at $59.95 per month with a download speed of 256Kbps and upload speed of 64Kbps.

Potential ISDN users, however, will be required to pay $45.50 per month for their home line rental, in comparison to the usual $23.50 line rental for home phone lines. This makes the ISDN plans as expensive as higher-speed ADSL services.

As well as the monthly charges, consumers will incur a one-off self-installation setup fee of $190.30, which covers the cost of converting their line from PSTN (public switched telephone network) technology to ISDN (integrated services digital network). ■
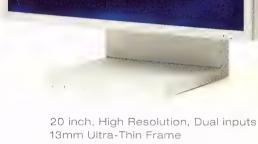
Delving into dual booting

The August issue's In Depth article on Dual Booting Windows 98 and XP (page 133) is one of the best articles I have read on this subject. Can you please advise on suggested partition sizes for each partition recommended? I have an 80GB HDD.
– Chris Adams

Scott Mendham, eMedia Producer responds: It depends on what you are going to do with your computer, but allow about 5-6GB for C and about 10GB for the XP partition. I like to have a huge drive for temporary storage of video, so this is about 50GB (the rest is allocated to other drives as outlined in the article). Feel free to ask questions at **www.helpscreen.com.au** too. You can get other opinions and everyone can share the info.

Sluggish dial-up

I have just purchased the September issue of your fine magazine and was drawn to the letter from Chris Mills included in your editorial — particularly the part "I regularly get connection speeds of as little as 16Kbps and often have trouble connecting the first time". That's familiar.

I can empathise with Chris and his dial-up connection speed of 16kbps. Although mine is perhaps a bit faster, it is no less exasperating to note that after everyone else in Melbourne has gone to bed (after 12.30 a.m.) the download speed of my modem (regularly 4.84Kbps but sometimes as low as 3.73Kbps) rises to between 11 and 13Kbps, which makes one heck of a difference when downloading even a 6MB file.

What speed should a dial-up with a 56Kbps modem download at? Is there a standard? Or are the poor old consumers stuck with whatever the telcos serve them?

I do have plans to shift to a broadband Internet setup in the near future and I know who it won't be with.

Your article on broadband in the September issue is basically informative, although I would have liked to have seen more modems reviewed and preferably tested.
– Andrew Morrison

Radeon-killing notebook graphics performance

I'd just like to congratulate you on putting together the Best Buys section in PC World magazine. It has become an awesome reference point for value-for-money purchases.

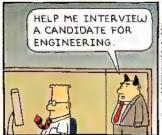One quick question: any idea when you will be reviewing the Hi-Grade Notino C6700 (Centrino model)? I've seen the spec sheet on the Hi-Grade Web site and am pleased to see a 64MB NVIDIA GeForce FX Go5200 as part of the standard configuration. This should bring performance a little closer to the Radeon-equipped notebooks, don't you think?
– Sam Kartam

Danny Allen, Reviews Editor responds: In the course of testing for this month's issue, at least 15 notebooks have been put through their paces. At least four of the new notebooks that have performed well enough to make it into the charts feature a GeForce FX Go graphics controller, so turn to page 101 for some Radeon-killing graphics performances. ■

Wireless PDA and more

BLACKBERRY 7230

Research In Motion's BlackBerry is a PDA with a built-in GPRS modem, so there's no dialling in — e-mail is delivered to your handset automatically and sent when you press send.

As well as being a handheld e-mail terminal, the BlackBerry is a conventional mobile phone, so you can make voice calls and send and receive text messages on it. And it has all the PDA applications you'd expect — diary, contacts database, to-do list, memo pad, alarm clock, calculator and game (BrickBreaker, a version of the classic Breakout).

These applications are written in Java, an independent language developed to run on any machine, but they are effectively proprietary. When using the desktop synchronising software they prove no less compatible with Windows XP than Pocket PC applications.

Introduced to Australia by Telstra, Blackberry is still only available as a corporate business tool — the cost of server software required is simply out of the consumer league. Telstra does say it is planning to offer a Small to Medium Enterprise version of the package by year end.

Unlike most PDAs, BlackBerry does not have a touchscreen and stylus, which is a big plus in our opinion. You navigate using a thumbwheel at the side, which you also press to select. Situated below is an escape button. The tiny Qwerty keyboard is surprisingly usable despite its small size. It's good enough for composing short e-mails and a breeze for text messages.

After one charge the battery lasted for a week of a few brief phone calls, several dozen text messages, well over 50 e-mails, and a high score of 4585 on BrickBreaker.

To get your company e-mails forwarded incorporates a layer of complexity that only an IT professional would tackle. We have a few other minor quibbles, too: the Cancel button is easily pressed by mistake just picking up the device, and clicking the thumbwheel without rolling it requires a precise but gentle touch — not something you're thinking about if you're in a hurry.

And the alarm doesn't work when the device is off, unlike many mobile phones. So if you're using BlackBerry as a travelling alarm clock, you have to leave it on overnight and hope your sleep isn't disturbed by your stalker, spouse or bozo colleague who doesn't appreciate the time difference in New York.

But these really are minor issues. To use the BlackBerry is to love it.

BlackBerry is the closest we've seen to a universal handheld communicator: e-mail, SMS, mobile phone and PDA all in one pocket-sized package, with a decent colour screen and no stylus to lose. If there was a foolproof, easy way of integrating private and company e-mail accounts it would be truly magical. ∎
– *Andrew Charlesworth*

REVIEW RATINGS

★★★★★

IN BRIEF:

RIM BlackBerry 7230
★★★★
E-mail, phone, text and PDA in one pocketable package. Offers Tri-band support for international roaming (on 900/1800/1900MHz GSM/GPRS networks).
Price: Free on an over 24-month contract, with $95 a month minimum spend. This includes unlimited e-mail, calendar, contacts and tasks. Mobile phone calls and WAP usage is additional.
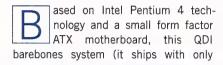**Distributor:** Telstra
Phone: 1800 726 008
URL: www.telstra.com/info/blackberry

Barebones PC

SLIM PC

Based on Intel Pentium 4 technology and a small form factor ATX motherboard, this QDI barebones system (it ships with only case and motherboard) will accommodate 533MHz front side bus CPUs and up to 2GB of memory.

This system is not as small as other barebones systems from this maker, such as the QDI Mini PC (also available from BCN for $529), so cooling the interior should not be a problem as there is plentiful room for airflow. A cylindrical fan that sits parallel to the motherboard and CPU at the rear of the case helps to extract warm air that builds up. Apart from the CPU and motherboard, warm air is generated in a computer system by the hard disk and optical drive. This enclosure has space for one each of these types of devices and their installation is very easy due to removable drive bays, which in turn provide easy access to the memory slots.

The front panel of the unit features USB and audio ports. The rear has the usual grouping of connectivity afforded by a Pentium 4-based motherboard, and also includes a 10/100 Ethernet port plus an S-Video out port.

Although this system is very solidly built and stylishly designed, using metal and acrylic, the motherboard lets it down when it comes to expansion. It does not offer an AGP slot, only a PCI slot, and this means that the user will have to make do with just the onboard Intel graphics that it offers. These graphics are ample for everyday applications, but gamers need not apply. ■

– *Elias Plastiras*

The black pearl

DESKTOP BOARD D865PERL

Few people are aware that Intel makes and sells motherboards for consumers. They are usually very plain boards focused on reliability rather than extravagance. With the release of the D865PERL, though, Intel has shipped a reliable board with all the features that mainstream and enthusiast users require, ranging from an onboard FireWire port to integrated Serial ATA ports and digital audio capabilities. What's more, it's black.

Based on the Intel 865PE chipset, the motherboard will accommodate the latest 800MHz FSB-equipped Pentium 4 chips as well as 533MHz or 400MHz CPUs and, of course, those that feature Hyper-Threading. Dual-channel memory configurations can be implemented via the four available memory slots and they support DDR SDRAM modules up to the DDR400 specification. Testing with 400MHz and 333MHz modules revealed no gain in performance, so you are better off saving your money and sticking to the DDR333 standard for maximum cost efficiency.

The board's layout offers little space between the AGP slot and the memory levers, so memory can not be manipulated unless the graphics card is removed. There are four fan connectors on the board for cooling and, depending on the type of case you have, the IDE and power connections are clustered together and could cause some cable clutter. There are five PCI slots for expansion. Provision for front-loading ports has been made through the internal USB 2.0 pin headers.

The board performed very well in our tests. Apart from some hiccups during the installation of the network drivers, the end user experience was very smooth. It ships with a useful software bundle, too, comprising CD burning, digital video recording, system recovery and disk management utilities. ■

– *Elias Plastiras*

TEST	SCORE
SYSMark 2001	287
3DMark 2001 SE	17331
Quake @ 640x480	301
Quake @ 1024x768	296

Configuration: 512MB DDR400 memory (dual channel), 3.2GHz CPU, 120GB Serial ATA Seagate hard drive, 128MB Gigabyte Radeon 9800Pro, Windows XP Pro

Easy Web editing tool

CONTRIBUTE 2

It doesn't seem very long ago that we first looked at Macromedia Contribute, the $226 desktop Web maintenance tool designed to make Web content updates easy for everyone. This second release adds a few new features, including greater security with SFTP (Secure File Transfer Protocol) support, FlashPaper — a new print-to-file tool, and drag-and-drop e-commerce buttons with
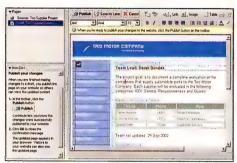
back-end merchant services by PayPal.

Macromedia has kept this browser-orientated tool simple, making Contribute particularly ideal for delegating content maintenance of an existing Web site across a number of people who have little to no experience with Web design programs. With a connection to their Web site up and running, users simply browse to a page and click the *Edit Page* button. Text can be pasted or typed in directly, and an Insert Table dialogue offers just the essential options, so nothing goes wrong.

Contribute also lets Windows users import the content of Microsoft Word and Excel documents. All elements in a page can be rearranged with drag-and-drop functionality. Users can also create new pages and use existing templates.

FlashPaper, based on printer-driver technology, acts much like a PDF creator,

Contribute 2 features excellent tutorials to get you up and running in no time.

converting a printable document to a format that can be viewed in any browser that supports Flash. The FlashPaper viewer sits neatly within a Web page, offering a clutter-free interface for users to scroll through documents, zoom or print. Unfortunately, only Contribute users on Windows 2000 and XP platforms can use this great new tool. ■
– *Molly Furzer*

Stronger protection

ZONEALARM PRO 4

Zone Labs ZoneAlarm has always been a reliable firewall, and the latest Pro version continues this tradition. In my informal testing, it easily fended off port scans while simultaneously keeping a close eye on Internet-enabled applications.

You can download the basic firewall for free, but spending $US50 on ZoneAlarm Pro 4 brings you extra bundled goodies that block cookies, Web ads, browser pop-ups and e-mail worms. Best of all, in my tests Pro 4's extra features did not cause

any of the system problems some users experienced with its predecessor.

Beyond its fundamental firewall and blocking capabilities, Pro 4 offers more tools for e-mail. In addition to the Inbound MailSafe feature that quarantines suspect e-mail attachments, Pro 4 includes a new, configurable Outbound MailSafe feature that stops mass-mailing viruses and worms by halting messages sent to more than 50 recipients, thwarting attempts to send more than five messages in two seconds, and warning you when an application other than your e-mail program tries to send a message.

These new features make Pro 4 a more robust privacy watchdog, but the program's Alert Advisor remains a weak spot. Meant to offer detailed information when Pro 4 detects a new application trying to access the Internet, Alert Advisor fails to identify most apps — even some that are well known, such as Netscape, let alone
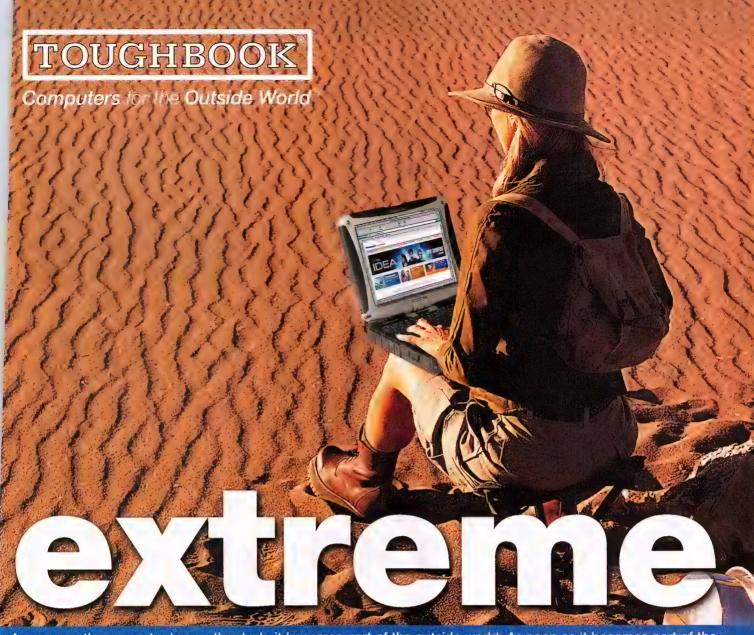

ZoneAlarm Pro 4 has privacy controls not found in the free version of the software.

adware programs such as Ezula and Gator. Instead, the program offers generic advice, noting that if you (and ZoneAlarm) cannot identify an application, "it is safest to adopt a cautious strategy".

Still, Zone Alarm Pro 4 improves on its well-reviewed predecessors. A rock-solid firewall coupled with superior e-mail tools, it's a worthy upgrade and a strong addition to any privacy arsenal. ■
– *Sean Captain*

Minor evolution
POWERSHOT G5

With 5-megapixel cameras proliferating, Canon's popular PowerShot G series arrives at the party a bit late. Nonetheless, the $1599 PowerShot G5 keeps Canon's advanced model competitive with Nikon's 5000 series and Olympus's C-5050, both of which shipped months ago.

A 1Mp boost over Canon's existing G3, the G5 only nominally advances the G series. It retains the boxy-but-efficient design of the G3, along with the same impressive list of exposure specs, including 4X optical zoom, a fast f2 lens, and a comprehensive selection of creative exposure controls. It also preserves one of its predecessor's least-desirable traits: a lens barrel that intrudes into the corner of the optical viewfinder.

Advanced photographers should profit from the G5's array of esoteric controls (nearly all carryovers from the G3), such as a focus-bracketing option that takes three successive shots at slightly different levels of focus, ensuring you always get the shot — a feature I have yet to see on any other brand of digital camera. New to the G5 is a second custom white-balance setting, which is useful for shooting a series of shots under different light sources. The G5 doesn't boot

The 5Mp Canon G5 has an all-black body.

up especially quickly, but its combination of numerous well-labelled, dedicated buttons and a dual menu system makes it faster to operate than its rivals.

And lastly, the photographs: my test shots lived up to my high expectations, exhibiting fine detail and subtle, lifelike colouring. Overall, I enjoyed using the G5. That said, satisfied owners of the G3 should skip this update unless they really need the extra megapixel. ■

– Tracey Capen

IN BRIEF:

pc world RECOMMENDS

Canon PowerShot G5
★★★★⟨

Late to this market, the G5 is a modest update of the worthy G3.
Price: $1599
Vendor: Canon
Phone: (02) 9805 2000
URL: www.canon.com.au

See and be seen
WEB CAMERA

Apple has a gift for taking existing technologies and making them more simple and elegant to use — and that talent has never been more evident than with the company's new $259 iSight Web camera. I tested the unit with the beta version of the company's iChat AV instant messaging program, and found it remarkably easy to use. Unfortunately, Windows users can only watch for now: both products are Mac exclusive.

The iSight looks cooler than other webcams, with an aluminium exterior that matches Apple's new G5 desktops. Using one of the three included stands, the iSight perched easily atop my iBook notebook. The iSight connects via FireWire and requires at least a 600MHz G3 processor, plus a broadband connection to transmit the video.

I downloaded the iChat AV beta (a final version of the software will ship later this year), installed the program, plugged in the camera, and instantly started video chatting with a comparably Mac-equipped friend. No drivers were necessary. My two-year-old iBook 600, which met the minimum required specs, could muster only 15fps — better than most video chat products, but still giving the impression of moving in slow motion. Apple says that chatters at each end need iChat AV and at least a 1GHz G4 system to get television-quality, 30fps video.

The autofocusing iSight offers a good picture, and its built-in microphone captures

Apple's sleek new iSight camera.

sound well, though you can often hear a slight echo of yourself when chatting.

Currently, in order to fully utilise the iSight's capabilities you need Apple's iChat program. However, since the camera is built on industry standards for video, PC compatibility may not be far off. With the right video-enabled chat client, both Mac and PC chatters could use this handsome piece of hardware for video-conferencing.

For more information on using iSight and iChat, go to this month's Mac OS Here's How tutorial on page 143. ■

– Michael Gowan

IN BRIEF:

Apple iSight web camera
★★★⟨

Web camera simplifies video chat with iChat AV, but Mac hardware requirements are strict, and it won't yet work on a PC.
Price: $259
Vendor: Apple
Phone: 13 3622
URL: www.apple.com.au

Server operating system

WINDOWS SERVER 2003

I t may have been delayed, but Microsoft's latest server operating system has been well worth the wait. Some three years in the making, Windows Server 2003 is more an evolutionary than a revolutionary upgrade to its predecessor, Server 2000. The most significant changes are the integration of the .NET framework and the much improved Internet Information Server 6.0. Version 2003 offers a heap of performance improvements and enhancements that are designed to make Windows-based networking faster, more reliable and more secure.

Windows Server 2003 comes in four editions: Web, Standard, Enterprise and Datacenter (which can only be bought with a server). The Enterprise edition scales up to eight processors and 32GB of RAM on x86-based hardware. The upcoming 64-bit version of the OS (for Intel Itanium-based systems) supports up to 64GB of RAM, and the Datacenter edition will support no fewer than 32 processors and 512GB of RAM.

Security, a known Microsoft weakness, has been addressed with Windows Server 2003. There are more than 20 security features such as IIS (internet information services), clipbook, licence logging, telnet, terminal service session discovery and

Every Windows Server 2003 network needs to be installed using the Manage Your Server window.

Among the raft of management improvements, Windows Server 2003 now has a Terminal Services client that's a management console snap-in.

Network DDE. However, these features aren't enabled by default — you must explicitly install each in turn.

Other enhancements such as driver protection, process isolation and fault tolerance all contribute towards this OS's excellent stability. Individual servers can handle more users, and backup and recovery won't slow performance. By any measure, Server 2003 is faster than its predecessors, although these performance gains will be noticeable only on larger networks.

IIS 6.0 is very different in this OS update. The app has been cut into modules and now separates Web server operations from Web site application code processing. The result? It runs more quickly. You can also apply patches without downing the server — a major boon. Sadly, though, there is no direct upgrade path from IIS 5.0.

Enterprise-class installations will benefit from 2003's Virtual Disk Service, which integrates the OS with directly attached SAN and NAS backup systems. You can now snap storage management tools directly into the Microsoft Management Console, which is a real timesaver. Support for the emerging iSCSI storage networking protocol became available in June.

One potential brow soother is the Volume Shadow Copy service. This lets you take a 'snapshot' of single or multiple volumes. Users can then view and optionally restore files from the snapshot, which effectively lets you travel back in time to recover accidentally deleted files without IT intervention. All of which sounds too good to be true. It is — Windows Server 2003 does have a down side.

Surprisingly, the operating system offers poor backwards-compatibility with existing server apps. It can't even run most versions of Microsoft's own major server programs like SQL Server and Exchange — you must upgrade to the 2003 versions, but these have yet to be released. As for the rest of your NT or Windows 2000 applications, it's likely that as many as one in three programs won't run.

One possibility of redemption lies in Virtual Server. Microsoft recently bought the virtual machine assets of Connectix and is turning them into this add-on. Virtual Server will let users running a Windows NT 4.0 line of business applications continue to run them as a 'virtual machine' alongside Server 2003. ■

– Roger Gann

IN BRIEF:

Microsoft Windows Server 2003

★★★★

Windows Server 2003 is a significant improvement over its predecessor. Fundamental changes are thin on the ground, but the new server is noticeably faster. If you're about to deploy a new network, this is definitely one for the shortlist. Those with NT servers to upgrade may need careful forethought before making the jump, though.

Price: $2079 up to five seats
Vendor: Microsoft
Phone: 13 2058
URL: www.microsoft.com.au

Latest hard disk and CD MP3 players

Two new though very different players will supply hours of audio playback — just decide if you prefer a CD-based unit (from iRiver) or a hard disk-based one (from Creative).

SLIM AND TRIM PLAYER

At just 13.7mm thick and weighing 145g, the iMP-550 is touted as the slimmest CD/FM radio/MP3 player currently available. It is fashioned in sleek dark blue and silver casework made from magnesium die-cast to help protect against shock and scratches.

With a stated 55 hours of playback life, the iMP-550 is bundled with two AA rechargeable batteries that automatically charge (including during playback) when the player is connected to an outlet using the supplied AC adaptor.

Able to read the vast majority of CD types (including 650MB/700MB CD-R, 8cm and CD-RW discs), the player supports MP3, WMA and ASF formats. This model has no controls or display on the main body itself, which is a minor gripe. Controls including playback, menu navigation, volume/EQ level, hold and mode are located on the wired remote control. This features an informative blue backlit four-line LCD display also able to show ID3 v2 3.0 tags and CD-text.

Firmware-upgradeable to cater for future software features and formats, the iMP-550's sound quality was excellent with the included earbuds. These double as the unit's radio antennas and up to 20 FM stations can be preset. Skipping was never an issue with an incredible 900 seconds of buffering (anti-shock) time provided for compressed audio such as MP3s and 320 seconds for audio CDs.

It features an optical/line-out audio connection and comes bundled with a car cassette adapter, carry case and external battery pack.

— *Danny Allen*

> **iRiver SlimX iMP-550** **Price:** $379 **Distributor:** JNC Digital
> **Phone:** (02) 9264 8677 **URL:** www.jnc-digital.com.au

QUICK TAKES

STURDY AND BEEFY PLAYER

If the 700MB capacity of the iRiver SlimX iMP-550 is not enough to meet your MP3 needs, then a hard disk-based player may be more to your liking.

Creative's latest incarnation of the Nomad Jukebox, the Zen NX, holds a beefy 20GB of MP3 files in its sturdy confines (roughly the amount of 28 full MP3 CDs) and is about the size of a standard cassette-based Walkman. Its build quality is very rigid, even though the front face is removable for installation of the rechargeable lithium ion battery. Menu and navigation buttons are on the sides of the player. The green backlit LCD screen on the front of the player presents the details of your tracks.
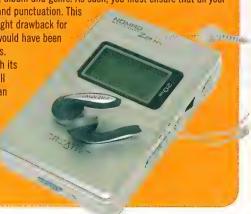
The player interfaces with a PC via a USB 2.0 connection and Creative FileManager 2 software can be used to turn the music device into a high-capacity portable storage device, simply by dragging and dropping files into it. Music files, however, have to be transferred with the MediaSource Organizer software, which is easy enough to use but has a quirk you need to be aware of. The Zen's operating system reads the ID tags of each track and stores them according to artist, album and genre. As such, you must ensure that all your tracks are impeccably named regarding spelling and punctuation. This method of track storage and identification is a slight drawback for this otherwise solid player, and a better method would have been to allow users to create their own folder structures.

The Zen emits excellent sound quality through its supplied earbuds and the rechargeable battery will provide up to 14 hours of continuous play. It has an 8MB playback buffer and also supports WMA and WAVE files.

— *Elias Plastiras*

> **Creative Nomad Jukebox Zen NX**
> **Price:** $499 **Vendor:** Creative
> **Phone:** (02) 9021 9800
> **URL:** http://australia.creative.com

Slim speakers, intriguing style

This sleekly styled 2.1 speaker system features two slim 9W satellite speakers and a 30W RMS wood-enclosed sub-woofer with side-mounted speaker and front bass port.

Creative has opted to use two titanium micro drivers on the front of each satellite, stating that titanium delivers greater sonic accuracy than aluminium. Dedicated amplifiers have been included for the drivers. Each satellite has a side-mounted lateral firing transducer which is designed to widen the listening headspace, in addition to improving lower mid-range frequencies such as male vocals and some drum parts; the transducers also have dedicated amplifiers.

Setup was straightforward with a quick start guide. All necessary cabling is supplied, including some unique dual-RCA plugs used for satellite connection. At 2m each, the satellite cable length was adequate, but an increase would be welcomed in future models.
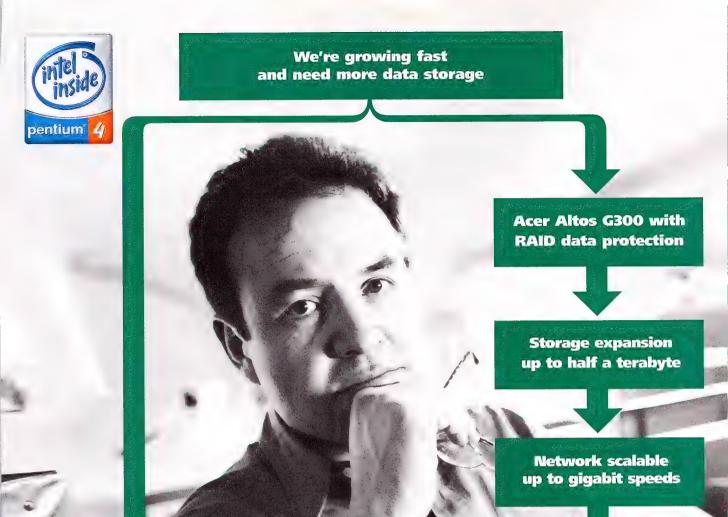
A wired remote control known as a control pod includes power/volume and bass level dials. The control pod features an m-port connector into which supported devices such as Creative's MuVo MP3 players can plug, providing music playback without the computer.

The mid- to high-end fidelity of this system stood out. Bass performance was also quite strong, but distortion crept in on some songs or when the volume was turned up too high.

Although the I-Trigue L3500 speakers are not the cheapest 2.1 PC system on the market, and their appearance is reminiscent of Altec Lansing, they are among the best we've heard in this category and come with a 12-month warranty. — *Danny Allen*

> **Creative I-Trigue L3500** **Price:** $349
> **Vendor:** Creative **Phone:** (02) 9021 9800
> **URL:** http://australia.creative.com

OPEN THIS FLAP FOR MORE QUICK TAKES

A3 INKJET PRINTER

Canon knows how to combine its own technology with great print quality and speedy delivery in its Bubble Jet printers, and the A3 i6500 is no exception. You won't get the best value for money in terms of running costs, but it's surprisingly cheap to purchase.

The i6500 connects via parallel or USB. Its plain boxy case isn't much of a looker, but it's what's on the inside that makes this model beautiful. It offers wide-format borderless printing with a good photo-quality output thanks to the high 4800x1200 maximum resolution. Since the i6500 is capable of achieving this resolution in hardware, rather than resorting to interpolation, its prints aren't suffused with unnatural colour.

Canon achieves the 4800x1200dpi resolution by its own MicroFine droplet ink nozzle technology that delivers five picolitre-sized ink droplets evenly over the page. The impressive results speak for themselves, but take extra care when installing the cartridges and printhead. Unlike a lot of inkjet cartridges on other manufacturers' models, the i6500's inks aren't in a sealed unit and can spill easily.

The ink is contained in four cartridges, which is much more economical than having to replace tri-colour cartridges when only one colour has run out.

We couldn't match the quoted print speeds from Canon but the i6500 maintained good rates on difficult print jobs. We printed a full-page A3 photo at the highest resolution and got stunning results back in only three minutes 12 seconds. Bumping up the quality settings eradicates some of the banding and dull colour problems.

– Spencer Dalziel

> **Canon Bubble Jet i6500 Price:** $799 **Vendor:** Canon **Phone:** (02) 9805 2000 **URL:** www.canon.com.au

Flat-panel display

The FlexScan L695 adds two new features to Eizo's line-up of flat-panel displays. ActiveRotation can display images in portrait or landscape mode with no need for extra software. The L695 uses a USB connection, so switching between modes can be done on-the-fly with no need to unplug and plug in the screen. The second new feature, ActiveShot, lets users perform two tasks on one screen — such as inputting data on one while watching share prices on the other. One thing to note, though, is that you can't use ActiveShot and ActiveRotation at the same time.

– PC World Staff

> **Eizo FlexScan L695 Price:** $2400 **Distributor:** Arcadia **Phone:** (02) 9239 1590 **URL:** www.eizo.com.au
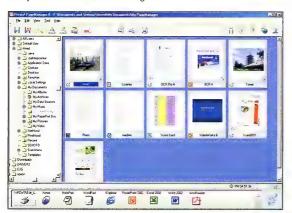
PAGEMANAGER 6: DIGITISE YOUR PAPER TRAIL

In any small office, it's a never-ending task to manage the waves of paper documents that wash in each day as regularly and irresistibly as the tide. NewSoft's $US80 Presto PageManager 6 helps you keep your head above water, and has tools to digitise papers you want to keep. The software can't quite equal its more popular competitor, ScanSoft's PaperPort Deluxe 9.

PageManager works with your scanner's existing driver software; in my tests, it performed well with an Epson scanner and an HP multifunction printer. After scanning your data, you can save it as is or you can use the app's tools to transform it. The image editing feature and OCR worked reasonably well, but the software's PDF generator proved useless, producing unacceptably blurry text time after time.
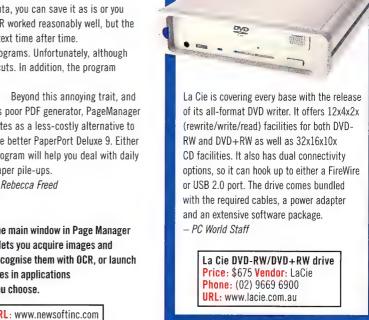
PageManager offers a customisable Application Bar for launching programs. Unfortunately, although you can edit which applications show up on it, you can't add folder shortcuts. In addition, the program always saves documents to a single default folder.

Beyond this annoying trait, and its poor PDF generator, PageManager rates as a less-costly alternative to the better PaperPort Deluxe 9. Either program will help you deal with daily paper pile-ups.

– Rebecca Freed

The main window in Page Manager 6 lets you acquire images and recognise them with OCR, or launch files in applications you choose.

> **Presto PageManager 6 Price:** $US80 **Vendor:** NewSoft **URL:** www.newsoftinc.com

DVD dual recorder drive

La Cie is covering every base with the release of its all-format DVD writer. It offers 12x4x2x (rewrite/write/read) facilities for both DVD-RW and DVD+RW as well as 32x16x10x CD facilities. It also has dual connectivity options, so it can hook up to either a FireWire or USB 2.0 port. The drive comes bundled with the required cables, a power adapter and an extensive software package.

– PC World Staff

> **La Cie DVD-RW/DVD+RW drive Price:** $675 **Vendor:** LaCie **Phone:** (02) 9669 6900 **URL:** www.lacie.com.au

COMPRESS AND ENCRYPT

Since its launch in 1991, WinZip has become one of the most popular programs for compressing and encrypting files for storage or sending. The latest version builds on the strengths of its predecessors by offering greater capacity, enhanced encryption and compression, and many improvements to the user interface.

To ensure that your files are kept safe from prying eyes, version 9.0 supports 128-bit and 256-bit key AES encryption. To put this into perspective, the US Computer Security Resource Centre Web site estimates that it would take around "149 trillion years to crack a 128-bit AES key". So, we'd say your files are pretty safe.

You are offered the choice of three different encryption strengths.

To lock down your files, simply choose the encryption strength you want and specify your password. One thing to note is that current recipients of AES-encrypted files must have WinZip 9.0 to decrypt them, although WinZip is working with third parties to expand support for the format.

Now that you know your files will be safe, you might want to store even more, which is fine because WinZip 9.0 has a much higher capacity. The new version's 64-bit extensions mean you can create archives that hold more than 65,535 files and are larger than 4GB. Despite their enhanced capacity, new Zip files are compatible with the old format.

To ensure that Zip files take up as little hard drive space as possible and are easier to e-mail, version 9.0 uses an 'enhanced deflate' compression method that cuts down file size.

Although an upgrade to 9.0 isn't a must, you will benefit from better security and support for higher capacity. Nervous users might want to wait for the final version that, at time of writing, was not available for download.
– Ursula Seymour

> **WinZip 9.0 beta Price:** Free trial beta version available for download
> **Vendor:** WinZip **URL:** www.winzip.com

Dual action gaming

Logitech's dual-action pad offers lightweight and easy controls for games enthusiasts. The device features two rubber-capped analog joysticks which provide gamers with 360° action control, and the D-pad allows more precise movement within the game. There are four responsive triggers and six control buttons to help eliminate opponents with ease. The plug-and-play connection can be used on both Macs and PCs, as can the supplied gaming software which allows customisation of the pad's performance. Gamers can also chat to each other, via the included Roger Wilco software, while enjoying multiplayer online games. The gamepad's smaller design means control is easier for younger players, and it also makes the device as lightweight as possible to minimise wrist strain.
– PC World Staff

> **Logitech Dual Action Gamepad Price:** $49
> **Vendor:** Logitech **Phone:** (02) 9972 3711
> **URL:** www.logitech.com

Compact and stylish personal digital assistant

Sony has once again updated its family of Clié handheld organisers. The SJ22 is the new entry-level model and, while it doesn't feature any new and exciting technology, it once again redefines this product category in terms of price.

Demonstrating Sony's legendary gift for product naming, the SJ22 replaces the SL10 yet utilises the SJ30's features. Confused? Let us explain. The previous entry-level model, the SL10, had a monochrome screen and was powered by standard AAA batteries. Its big brother, the SJ30, used a colour screen and a rechargeable lithium ion battery.

Now those two products have been phased out, and Sony has taken the SJ30's mid-range features and made them available as an entry-level product. For just $449, the SJ22 offers an impressive array of features. Principal among these is its excellent 320x320-pixel backlit display — the first time colour has been available at this price point.

Onscreen text and graphics don't look as good as on the higher-end Cliés and Palms that run Palm OS 5.0. However, Sony uses a utility called High Resolution Assist that enables most applications to take full advantage of the increased pixel count.

Aside from some minor differences, the SJ22 is physically identical to the SJ30: compact and stylish with a cover that flips behind the device when in use. It's not supplied with a HotSync cradle, but its redesigned attachment makes it a doddle to plug in both the power and USB cables.

The software bundle includes the usual Palm OS applications as well as a suite of Sony software for viewing still images or video, and managing data on a Memory Stick expansion card. There's an alarm clock, too. Sadly missing is Documents To Go, a package for viewing Office documents which is usually bundled with most personal digital assistants. *– Alex Katz*

> **Sony Clié PEG-SJ22 Price:** $449 **Vendor:** Sony **Phone:** 1300 137 669 **URL:** www.sony.com.au

USB 2.0 media reader & writer

Using a USB 2.0 connection that is up to 40 times faster than its predecessor, the Belkin media writer allows users of flash memory-based devices — such as digital cameras and PDAs — to rapidly transfer data from a media card to their PC and *vice versa*. Not only that, the 8-in-1 can drag and drop files from one memory card to another and even transfer files simultaneously from four media cards. The device reads the following formats: Secure Digital, CompactFlash I and II, SmartMedia, MultiMediaCard, IBM Microdrive, Sony Memory Stick and MagicGate Memory Stick.
– PC World Staff

> **Belkin 8-in-1 Price:** $89 **Vendor:** Belkin
> **Phone:** (02) 4372 8600 **URL:** www.belkin.com/anz

We offer technical support – anytime, all the time.

If you purchase an Acer server such as the Altos G300 powered by the Intel® Pentium® 4 Processor, it is backed by Acer's 24 x 7 service hotline. So, in the unlikely event that you do encounter a problem, you can call anytime and one of our experienced technicians will help work through the problem with you on the spot.

We'll help you BuildYourOwn computer.

Build your own Acer computer online, customised to your specific needs. Put it all together at www.acer.com.au. Just click on ShopAcer and select the product that most closely fits your needs, then use the drop down menus to customise your selection. Our on-line glossary explains each upgrade, making it easier to make the right choices when customising your computer. And because we know cost is important, you can update your quote each time you upgrade. Then buy online, call us or save your configuration and take it in to your nearest authorised dealer. It's that easy.

We'll fix your notebook fast.

In business, now more than ever, time is money. And you don't want to waste it because of any notebook problems. With Acer's 2 hour Commitment Warranty Express Service**, available with all our notebooks – such as the TravelMate 250LC powered by the Mobile Intel® Pentium® 4 Processor, we guarantee that when you take it to your nearest Acer Repair Centre, we will endeavour to have it running again in 2 hours or less. There's no other repair service warranty that compares.

We'll match any competitive price.

The Acer Price Guarantee ensures you get quality at a great price. In fact, we'll match any competitive price* from Dell, Compaq, IBM, HP or Toshiba - and we'll give you a discount voucher to the value of up to $200** to use on a wide range of peripherals.

Graphics with the GIMP

BY ALASTAIR COUSINS

The GNU Image Manipulation Program, or GIMP for short, is a high-quality 2D bitmap graphics creation and editing tool. The GIMP is included in most Linux distributions, and also can be downloaded from **www.gimp.org**. It is a part of Knoppix, the Linux distribution included on the cover of this month's magazine, and can be started by clicking the *K* button and selecting *Multimedia-Graphics-The GIMP*. (See Here's How Linux, page 134 for more on Knoppix.)

If you have ever used Adobe Photoshop, you'll find the GIMP interface is familiar. It's divided into several windows, the main one containing a collection of tools and the current colours in use. Each image is displayed in its own window. Other useful windows can be brought forth by selecting them from the *File-Dialogs* menu in the main window.

Screenshots and scanners

If you have ever wanted to show off your Linux desktop, you can take a screenshot using the GIMP by selecting *Acquire-Screen Shot* from the *File* menu on the main GIMP window. The GIMP can take screenshots of a single window, or of your complete desktop.

If you have a scanner or TV card, you can acquire images from it using the appropriate option under the *Acquire* menu. After selecting an option, the XSane application will start automatically. To capture the image, all you need to do is click the *Scan* button in the XSane window and it will automatically be imported into the GIMP.

Extending the GIMP and Script-Fu

Modularity is at the heart of the design of the GIMP. Major aspects of the program — such as brushes, palettes and plug-ins — can all be extended via add-ons from third party sources. Finding new tools for the GIMP can greatly improve your creativity. There is no definitive resource for GIMP add-ons, so your best bet for finding them is to perform a Google search using phrases such as "gimp brushes" or "gimp palettes".

Scripting support is one of the most powerful features built into the GIMP. All aspects of the program can be scripted using the Script-Fu language. A collection of sample scripts — many of which are so useless they can only have been included to show off what is possible — is included with the GIMP and can be accessed either by right-clicking on an image and selecting the *Script-Fu* menu, or by selecting *Script-*

Fu from the *Xtns* menu on the main GIMP window. There are many third party Script-Fu repositories on the Web. Like extensions to the GIMP, the best way to locate extra Script-Fu scripts is via a Google search for "Script-Fu".

Script-Fu can be a handy tool for processing large batches of images. For example, you may have a collection of holiday photos which need retouching to look their best. Using Script-Fu, you could write a script to perform a colour correction, adjust brightness and apply a sharpening filter; to retouch the image, you simply load each image and select the script from the Script-Fu menu. This is obviously a lot quicker and easier than performing each touch-up by hand.

Learning the GIMP

A number of resources are available online to teach you how to use the GIMP effectively. A good place to start is the online version of the book *Grokking the GIMP*, available at **http://gimp-savvy.com/ BOOK** (you can also purchase a paper copy here). The book is now a couple of years old, but the GIMP has not changed significantly in this time so the content is still helpful and relevant.

The manual provided by www.gimp.org is also a very good resource — **http://manual.gimp.org/manual/**. A particular highlight of the manual is the Script-Fu tutorial located at **http://manual.gimp.org/manual/GUM/write_scriptfu3.html**.

After browsing the manual to get a feel for what the GIMP is capable of, you should spend some time experimenting with the features available. The GIMP is a creative tool, so ultimately there are no rules about how you should use it. Save your work as you experiment using a format such as PSD (Photoshop document) which preserves layers in images, allowing you the most flexibility when you return to edit an image later. If you are using the GIMP in Knoppix, remember to save your work to a floppy or your hard drive, as it otherwise may be lost when you exit Knoppix. ■

The GIMP interface is similar to that of Adobe Photoshop.

ILLUSTRATION: PETER HOEY

E-mail evolves

New products and Web services are designed to help you fight the battle of in-box overload.

BY GLENN MCDONALD

THE E-MAIL PROGRAM you're using today hasn't changed much from the time when a handful of messages — not hundreds — was a full in-box. But now, after years of stagnation, e-mail technology has got a second wind. A flock of new programs and Web services promise to help you control, sort, and search your incoming message flood so you can save time and get more real work done, instead of wading through low-priority missives.

We took a look at some of the most promising members of the new breed. Though not all of them may be suitable for your needs, it is likely that one or more of them can help free you from in-box bondage.

A FRESH START

If you're serious about solving your e-mail issues and are willing to ditch your existing e-mail application to do so, Bloomba may be for you. Roughly 10MB, this stand-alone e-mail program from Stata Labs is currently offered as a free beta trial (a final version will ship later this year for about $US40). Bloomba's main selling point is its impressive power searching and sorting functions. The software operates as a POP3 client (or with POP3 forwarding with Microsoft Exchange and Web-based accounts) and works in Windows 98, 2000, or XP.

Bloomba's interface closely resembles current versions of Outlook, with a familiar left-hand folder stack and viewing pane. The most obvious difference is the search control panel anchored above the in-box. There's no need to open a separate 'advanced search' window with Bloomba — it's all advanced, and it's all there in the control panel.

Spend about half an hour learning Bloomba's shortcuts and tricks, and you'll save loads of time later. You can search within subject lines, body text, and even text attachments; specify a date range for a search; and save and revisit recent or frequent searches. There are also buttons for one-click sorting and collapsing by thread or subscription.
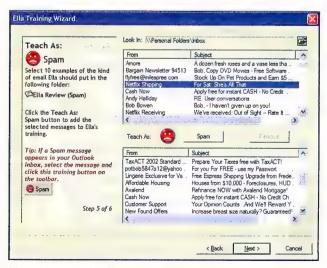
To test Bloomba's ability, we searched for a specific name (in the recipient list, body text, or attachment) among all in-box documents from the past three months, collapsed the resulting list into a directory, and sorted by thread — all within the control panel. The software generated search results in the in-box as we tweaked the parameters. Bloomba's biggest weakness: it lacks an address book, relying instead on autocomplete technology. (But the feature should be in place by the time you read this.) Another minor drawback is its relatively generic spam protection.

Apart from these issues, Bloomba is good stuff, and clearly geared toward power users who routinely maintain a deep in-box and are willing to learn a few tricks to mine it efficiently.

MOVE THE JUNK

Eager to clean up your in-box but unwilling to part with Outlook? An add-on called Ella may offer you a better fit.

Open Field Software's Ella is based on the idea that presorting e-mail and putting the junk aside is a great way to save time. In

Ella analyses more than 100 elements of incoming e-mail messages based on selections you make during the setup wizard.

SNEAK PEEK:

NEXT OUTLOOK TACKLES IN-BOX FLOOD

MICROSOFT FEELS YOUR E-MAIL PAIN. It's no coincidence that of all the applications in the company's popular Office suite, Outlook is getting by far the most visible makeover in the next version, due later this year.

IT STARTS WITH A NEW LOOK. The in-box, instead of sitting on top of the preview pane, is now a slim column sandwiched between the Outlook shortcut bar on the left and a much larger preview pane on the right. This layout creates much more room for the actual message (though in-box subject lines may be slightly truncated).

MICROSOFT HAS ALSO GREATLY IMPROVED OUTLOOK'S ABILITY TO LOCATE SPECIFIC MESSAGES — IMPORTANT WHEN YOU RECEIVE DOZENS A DAY. For example, you can save the parameters and results of a search to a folder that displays updated search results whenever you open it. And these search folders are virtual, which means that a single message can show up in multiple search folders.

OUTLOOK 2003 ALSO INCLUDES IMPROVED JUNK-MAIL FILTERING. The default 'low' setting catches only obvious spam, but if you set it on 'high', it's likely to grab the occasional nonspam message (so keep an eye on the Junk E-Mail folder). You can also turn off the filter altogether, or instruct Outlook to treat everything as spam except messages from identified trusted senders.

ANOTHER USEFUL MANAGEMENT TOOL. When e-mail arrives that Outlook identifies as legit, the program notifies you with a small, semitransparent window that shows the sender, the header, and a few words of text. The window quickly fades away, adding a charming Cheshire cat–like touch to this newly invigorated desktop fixture. —Yardena Arar

Outlook 2003 has a new design that offers a larger preview pane.

most e-mail programs, sorting depends on finding matches in a specific part of the message, such as the sender name or the subject line. Ella takes a more advanced tack — it analyses more than 100 elements of each message (from sender to content type to message route), looking for patterns.

The process centres on the choices you make as a six-step training wizard walks you through your existing Outlook in-box. The wizard prompts you to provide examples of the type of messages you definitely want to keep, those you may want to keep, and those you consider junk. Based on your selections, the program places your incoming mail in 'keep', 'maybe', and 'junk' folders.

MASTER E-MAIL: NEW WAYS TO GET CONTROL

From stand-alone services to plug-ins to new clients, these tools help fight in-box overload.

E-MAIL PRODUCT	DESCRIPTION	COST	COMMENTS
Bloomba[1] www.bloomba.com	E-mail client is search savvy and works with POP3 and forwarded accounts.	Free beta; $US40 at launch	Slick interface makes power searching easy, but spam protection is minimal.
Ella www.openfieldsoftware.com	Outlook 2000 and 2002 plug-in prioritises incoming mail.	$US30	Versatile, trainable sorting tool, but a little buggy. ★★★
Kubi Client www.kubisoftware.com	Program adds collaboration tools to Outlook 2000 and 2002, and to Lotus Notes 5 and 6.	$US149	Nicely integrated collaboration features, but pricey. ★★★★
Oddpost www.oddpost.com	Highly efficient Web-based e-mail works alone, with POP3 accounts, and forwarded Web mail.	$US30 per year	Speedy Web interface plus trainable sorting; basic spam filter. ★★★★

[1] Beta version, not rated.

Ella's attempts to learn by example are interesting, but its overall performance was somewhat frustrating. The wizard kept popping up whenever we launched Outlook, even after we completed the training (a bug the company is working to correct). Another known bug prevented the program from sorting the remaining messages after we finished the training.

The program divvied up subsequent e-mail messages with some success, but the initial accuracy wasn't good enough to make us feel comfortable handing over the task full-time. Although Ella's precision should increase with use, for a while it forces you to sort through three in-boxes instead of one — not exactly a time-saver. Billed as a smart in-box assistant, the 18MB downloadable program sells for $US30; a Pro version intended for enterprise users is expected to ship later this year.

NOW THAT'S ODDPOST

A growing number of users rely entirely on Web-based e-mail services for personal correspondence, since they're easy to use and accessible from anywhere. Unfortunately, free Web-based e-mail such as Hotmail and Yahoo Mail are slow, force you to view ads, and tend to offer limited tools.

Oddpost is different. For $US30 a year, this speedy Web-based service includes many of the features of a fully-fledged desktop client. In fact, it works almost exactly like today's Outlook, but it runs on the Web.

Created to be your new in-box, Oddpost also grabs messages from POP3 servers (you can customise your From and Reply To fields to retain your current identities). It does not retrieve messages from non-POP3-supported Web-based services — you must autoforward those accounts.
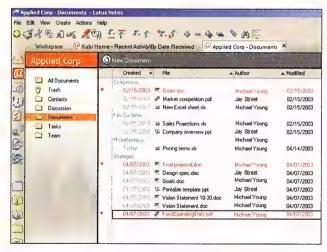
Nicely designed, Oddpost has a drag-and-drop interface that takes advantage of technology in recent versions of the Internet Explorer browser to let you move messages between folders without having to reload the Web page. This is a significant evolutionary step for Web-based mail, as any dial-up user frustrated by slow, constantly reloading pages can tell you. With Oddpost, you can do pretty much anything — composing, sorting, filing, deleting, sending, and filtering — within a single page. The one downside: the service works only with Internet Explorer 5.0 or higher.

As for spam, Oddpost has a basic screener that stops and redirects overtly spammish mail to a junk folder. It also has a feature for individually marking messages as legit or spam. Oddpost then uses a statistical analysis technique to adjust itself to what you consider spam. Beyond that, Oddpost doesn't try to sort your mail, but its lightning speed makes doing that yourself easier and quicker.

MORE-USEFUL E-MAIL

Instead of sorting or filtering incoming messages and spam, Kubi Software's product aims to eliminate messy threads and attachments by incorporating groupware options into your e-mail. It works with Microsoft Outlook 2000 and 2002, as well as with the groupware-orientated IBM Lotus Notes 5 and 6, and it requires an e-mail account on a Microsoft Exchange, IBM Lotus Domino, or POP3 server.

Kubi Client lets business users share documents, contacts, task lists, and team folders (it even lets Notes and Outlook users cross-collaborate). Team members create task-specific spaces that look much like your other e-mail folders, except that all team members can access and update them. When you are using the collaboration tools, Kubi Client opens two windows above your in-box with panes that list all active projects.

Kubi Client for Notes lets users categorise documents for easier access by the team members working on a specific project.

Kubi Client is essentially a workgroup application posing as an e-mail add-on. Directed at corporate users, Kubi carries a price tag of $US149 per user (enterprise licences are available); also, some of the product's high-end features will require the company's upcoming server software. Licensed users can invite others to participate on a guest basis at no additional cost.

Overall, we found all four of the products useful in their own unique ways. For ambition and potential, Kubi Client is the standout, pushing e-mail toward workgroup collaboration. Bloomba gets high marks as well for empowering users to employ their best filtering asset — their own two eyes — more effectively. ■

Pain-free WINDOWS TWEAKS

Want to fix nagging Windows irritations and automate everyday tasks?

With these surprisingly simple Registry and batch file tips, it's not brain surgery.

EVERYBODY'S GOT THEIR OWN WINDOWS PET PEEVE, whether it's the operating system's habit of shifting your desktop icons around or its proclivity for putting all the wrong files in your Recent Documents folder. While you can fix many Windows woes by changing a single setting, every now and then you encounter a problem or limitation that you can alleviate only by journeying into Windows' brain — the Registry — to adjust the resident grey matter.

Our 15 Registry tweaks and tools let you hide drive letters in Windows Explorer, lock Internet Explorer toolbars, and make other changes, some with the OS's tools, and some with a free Registry helper. And for a more nimble Windows, try our five downloadable batch files.

Proceed with caution

The Windows Registry is an arcane repository of an immense number of system and application settings. Make the wrong change, and you might not be able to start Windows again. The Registry is not a playground for creative experimentation. Begin by taking some precautions (back up!), and remember that any system change has the potential to be calamitous.

Go to **http://pcworld.idg.com.au/index.php?id=1502455844&fp=2&fpid=37** for information on the care and feeding of the Registry — including how to back it up.

In addition, back up the portion of the Registry you plan to change, just before you make the alteration: choose *Start-Run* (or press **<Windows>–R**), type **regedit**, and press **<Enter>**. Once you're in the Registry Editor, navigate down the tree diagram of keys (Registry-speak for folders) on the left until you reach the section you plan to edit. It's usually best to dig all the way down to the deepest level you intend to alter. That way, you back up the minimum amount of data necessary, which keeps the backup file small and — if you later decide to undo your change — prevents you from overwriting unrelated settings that may have changed.
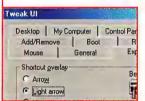
BY SCOTT DUNN

With the desired icon selected on the left side, choose *Registry-Export Registry File* (*File-Export* in Windows XP). In Windows XP, you can back up the file by right-clicking its icon in the left pane and choosing *Export* (see FIGURE 1). Make sure *Selected branch* is checked at the bottom of the Export Registry File dialogue box. Navigate to a folder where you can safely store the settings; type a name and click *Save*. Now you're ready to edit the settings. If you need to restore them to their prior state, locate the Registry (.reg) file that you just exported, right-click it, and choose *Merge*. Click *Yes* to confirm that you want to restore the data. Although merging a .reg file will restore any changed or deleted settings on the exported branch, beware: it will not remove new settings added after you exported the branch.

FIGURE 1: Back up just the keys you intend to change, by exporting the lowest possible branch in the Registry Editor.

Tools of the Registry trade

Does it seem a little odd (not to mention cumbersome and risky) that you must dig through an enormous database of Windows settings, manually adding and editing geeky strings of text, just to make your system look and act the way you wish? Fortunately, a number of fine people have come up with utilities that convert common Registry edits into simple point-and-click operations. These tools let you customise the appearance and behaviour of Windows features in ways that would otherwise necessitate a manual Registry change. Some Registry editing tools cost up to $80, but why pay anything? Here are our favourite free Registry tweakers.
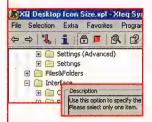

TWEAK UI: this is Microsoft's venerable standby. Get version 1.33 if you use Windows 9x, Me, or 2000. The version of Tweak UI for XP is part of the Windows XP Power Toys package (but you don't have to install the other toys if you don't want them). Go to **www.microsoft.com/ /NTWorkstation/downloads/PowerToys/Networking/NTTweakUI.asp** to download your copy.
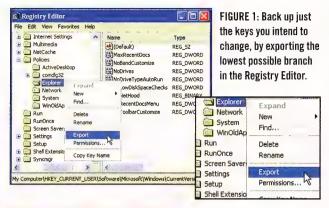

FRESH UI: sporting a much more elegant interface than Windows Explorer, Fresh Devices' Fresh UI program provides overview information on each of its many Registry tips and clearly indicates which settings will work in each version of Windows. You have to submit an e-mail address to get this product and its registration code, but you don't pay a cent. Go to **www.freshdevices.com** to download the program (or see the cover CD).

X-SETUP: Xteq's Xtra-geeky (but Xtra-thorough) utility is free to home users, libraries, charities, and government institutions. Businesses must register and pay $US200 for a 10-user licence. The program has both Power User and Wizards modes. Its Safe Mode explains every Registry change and lets you turn back before it applies one. Go to **www.xteq.com** to download a copy (or see the cover CD).

Freeze your Explorer view

Every time you log off, Windows saves the size and position of the taskbar, as well as the size and location of your Explorer windows (for the next time you open them). But you might want to set up your taskbar and folder window arrangement once and have Windows open that way in the future, regardless of how you mess with them during your current session. To do that, arrange your windows and taskbar the way you like them. Then launch the Registry Editor and navigate to HKEY_CURRENT_USER\Software\ Microsoft\Windows\CurrentVersion\Policies\Explorer. With *Explorer* selected in the left pane, look for the icon labelled NoSaveSettings on the right. (Not there? No problem. Just right-click in the right pane and choose *New-DWORD Value*. Type **NoSaveSettings** to name it, and press **<Enter>**.) When you're finished, double-click your *NoSaveSettings* icon to edit its setting. In the 'Value data' box, type **1** and press **<Enter>**. You may have to log off and log back on again before the setting will take effect. Thereafter, each time you log on and open Explorer or any folder window, it and the taskbar will return to the size and position you froze them in, even if you rearranged or resized them during your previous Windows session.

Hide a drive

If you want to discourage others who log in to your Windows profile from using a particular drive, you can shroud it in a cloak of invisibility so that it won't show up in Explorer. The drive will remain accessible, however: global searches will continue to examine its contents, some third-party file managers may still see it, and Microsoft Office apps will find it with no problem. But hiding the drive's letter in Windows Explorer may keep other users from damaging the drive by mistake.

To cloak a drive, open the Registry Editor and navigate down to HKEY_CURRENT_USER\Software\Microsoft\Windows\ CurrentVersion\Policies\Explorer. Look for an icon labelled NoDrives in the right pane. If you don't see such an icon, right-click anywhere in the right pane, choose the *New-DWORD Value* option, type **NoDrives**, and press **<Enter>** to name it. Double-click the *NoDrives* icon, and in the Edit DWORD Value dialogue box, select *Decimal*. In the 'Value data' box, type a value that corresponds to the drive you want to hide — for A: **1**; B: **2**; C: **4**; D: **8**; E: **16**; F: **32**; G: **64**; H: **128**; I: **256**; J: **512**; and so on. To hide multiple drives, add up the relevant numbers and type that sum in the 'Value data' box. For example, if you want to hide drives E: and F:, you would add 16 + 32 and type the sum, **48**, in the 'Value data' box. To hide all drives, type **67108863**. When you're finished, click *OK*. You'll have to log off and then log back on to see the effect.

Automate hard drive maintenance

Batch files trace their lineage back to DOS, but they're still handy for everyday Windows chores. This one scans your hard drive for errors and then defrags it automatically. If you have the appropriate apps, you can make it scan for viruses, back up data, and perform other chores. Go to the CD to download the files and instructions for Windows 98 and Me, Windows 2000, and XP (maintenanceWin98.zip, maintenanceWin2000.zip, maintenanceWinXP.zip). The Windows 2000 version requires that you download and install MorphaSys's free AutoDeFrag program (**www.morphasys.com/ autodefrag**) before you use it.

– Lincoln Spector

Two tasty tweaking tools

Windows' Registry Editor isn't the only way — nor is it always the best way — to edit the Registry, depending on the task. Many other Windows tools customise system settings without your having to edit the Registry directly. They may be designed for IT types, but they're accessible enough for mere mortals to wield as well.

One of these tools is System Policy Editor. To install it in Windows 98, insert your Windows CD-ROM into the drive and search for the file named poledit.exe, which should be in the tools\reskit\netadmin\poledit folder. Click *Start-Settings-Control Panel*, double-click *Add/Remove Programs*, select the *Windows Setup* tab, and click *Have Disk*. Navigate to the proper folder on the disc, select *poledit.inf*, and click *OK* twice. Check the System Policy Editor box, and click *Install*.
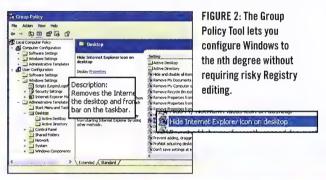
If you don't find it on your Windows CD-ROM, go to Microsoft's Windows 95 Update page at **www.microsoft.com/windows95/ downloads** and search for System Policy Editor.

Once you've installed the program, launch it by choosing *Start-Programs-Accessories-System Tools-System Policy Editor* or by clicking *Start-Run*, typing **poledit**, and pressing **<Enter>**. The first time you run System Policy Editor, it may prompt you to open a template. If so, locate and select the Admin.adm file to satisfy the program. Then choose *File-Open Registry* and double-click an icon (either Local Computer or Local User) to pick the portion of the Registry you want to edit. After changing a setting, choose *File-Save* or click the *Save* icon on the toolbar.

Windows Me doesn't include System Policy Editor, and Microsoft won't support its use in that version of the OS. Many of the controls will still work in Windows Me, but there's no guarantee.

For users of Windows 2000 and Windows XP Pro, the Group Policy utility provides point-and-click ways to customise Windows (in effect, you're editing the Registry). To launch Group Policy in these versions of Windows, choose *Start-Run*, type **gpedit.msc**, and press **<Enter>**. In the left tree pane, navigate to User Configuration\Administrative Templates for the most common customising options (see FIGURE 2).

FIGURE 2: The Group Policy Tool lets you configure Windows to the nth degree without requiring risky Registry editing.
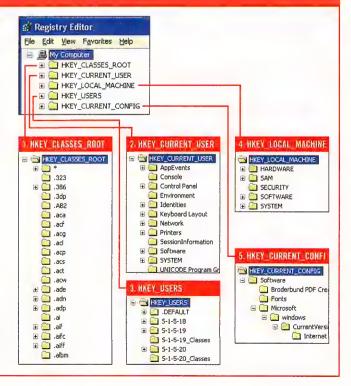
Inside the mind of Windows

Selecting a key in the Registry Editor's left tree pane displays its contents on the right, just as in Windows Explorer or any folder window. But Registry keys do not represent folders stored on your machine. Rather, they identify collections of settings.

With all icons collapsed, you see the major Registry sections: (1) HKEY_CLASSES_ROOT is where the Registry stores all file type, file association, and icon information. All settings or preferences specific to the profile under which you are logged in reside in (2) HKEY_CURRENT_USER. This data is also in (3) HKEY_USERS, along with the same settings for all other profiles. As you might guess, (4) HKEY_LOCAL_MACHINE contains hardware and related driver settings. The hardware configuration currently in use is in (5) HKEY_CURRENT_CONFIG.

Although careless changes to any of these sections can cause problems, HKEY_CURRENT_USER is the safest to work in. If you make a mistake in this part of the Registry and Windows starts behaving bizarrely, you can get around the problem by creating a new user profile and logging in to that one instead.

You'll lose all your preferences and settings, of course, but at least you won't have to remember which part of HKEY_CURRENT_USER you messed up.

The Registry's five major sections (shown right with some of their subkeys) hold all of Windows' system settings.

Though less functional than the Registry Editor, both the System Policy Editor and Group Policy let you tailor many Windows properties. For example, each tool allows you to restrict access to selected Control Panel icons, among other features. In Windows 2000 and XP Pro, you can use Group Policy to remove built-in items from the Start menu. Note that while both these tools can be used for many of the tips described here, not every version of Windows has them, so we present only the old-fashioned Registry Editor approach.

The System Policy Editor and Group Policy reduce many Registry settings to simple point-and-click controls. As a result, careless experimentation can lock you out of your own account or cause other serious damage. Don't ignore our advice to back up your Registry beforehand. And make sure that you check out "Tools of the Registry Trade" on page 46 for the low-down on some of our favourite third-party Registry editors.

Warn on bootup

Maybe you set up computers in a public venue and want a disclaimer to appear each time Windows starts. Or you might want the employees of your company to read a legal notice before beginning each workday (see FIGURE 3). Perhaps you just want to give your kids some important instructions when they get home from school and boot up. You can make such a message appear in a dialogue box before the Windows welcome or boot screen so that everybody who uses the machine will see it. All users will have to click *OK* in the message box before continuing.

FIGURE 3: Get every users' attention by posting a note that pops up whenever Windows starts to load.

Open the Registry Editor. In Windows 9x and Me, navigate the left pane down to HKEY_LOCAL_MACHINE\SOFTWARE\ Microsoft\Windows\CurrentVersion\Winlogon. In Windows 2000 and XP, go to HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\ Windows NT\CurrentVersion\Winlogon. If you don't see an icon labelled LegalNoticeCaption, right-click anywhere in the pane, choose *New-String Value*, type **LegalNoticeCaption**, and press **<Enter>**. Create a String Value icon named LegalNoticeText, if it doesn't already exist in the Winlogon key.

Double-click *LegalNoticeCaption*. In the 'Value data' box, type the text you want to appear in the message's title bar (you can leave this blank if you prefer), and press **<Enter>**. Next, double-click *LegalNoticeText*, type your message in the 'Value data' box, and press **<Enter>**.

The warning dialogue box accommodates a pretty large paragraph; if you plan to input more than a couple of sentences, you should probably compose the message in Notepad or another text editor, double-check it, and then paste it into the 'Value data' box in the Edit String dialogue box. To remove the message later, simply return to this setting and delete any text you added for LegalNoticeCaption, LegalNoticeText, or both.
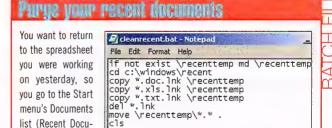
Lock that taskbar

XP is the first version of Windows that lets you lock the taskbar so you can't move it inadvertently. (Right-click the taskbar and choose *Lock the Taskbar* to activate the feature.) To add this capability to Windows Me, position and size the taskbar to your liking, then open the Registry Editor, navigate the left pane to HKEY_CURRENT_USER\Software\Microsoft\Windows\ CurrentVersion\Explorer\Advanced, and look for an icon in the right pane named TaskbarSizeMove. If it's not there, right-click in the right pane, choose *New-DWORD Value*, type **TaskbarSizeMove**, and press **<Enter>**. Double-click the icon and set 'Value data' to **0** to immobilise the taskbar.

The next time you log on, you won't be able to move or resize the taskbar, but you can add and remove toolbars by right-clicking the taskbar and choosing *Options* from the *Toolbars* submenu. You can also resize and rearrange individual toolbars.

If you want to resize the taskbar or drag it from one screen edge to another, you can change the TaskbarSizeMove Registry setting: return to the Registry branch above, double-click *TaskbarSizeMove*, and change the 'Value data' setting to **1**. Click *OK*, log off, and log back on to make your taskbar movable once again.

Lock those toolbars

Windows 2000 and XP let you freeze the position of your toolbars in Windows Explorer and Internet Explorer (right-click a toolbar and choose *Lock the Toolbars* to activate this feature). You can still add or remove individual toolbars and customise the Standard Buttons toolbar, but there's a way to increase your

Launch multiple programs

Some chores require you to open more than one program. This batch file lets you launch several programs at once. In Windows 98 or Me, each line of the batch file should contain the command to launch a particular program or file, as in c:\quickenw\qw.exe or "c:\my documents\finances.xls" (the quotes are required because of the space in the file path). End the batch file with the command cls on the very last line. In Windows XP or 2000 (shown here), your batch file must point to file shortcuts rather than to the files themselves. It's best to collect the shortcuts you need in one folder.

You'll have to make this batch file yourself, so simply open Notepad or the text editor you prefer and type in the command lines shown, altered to point to the applications you need to open.

– Lincoln Spector

```
c:\batchlinks\finances.lnk
c:\batchlinks\citibank.url
c:\batchlinks\quicken.lnk
```

toolbar options in any version of Windows simply by adding a couple of settings to your Registry.

In the Registry Editor, navigate in the left pane to HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer, and select this key. If the right pane doesn't contain an icon labelled NoBandCustomize, right-click in the right pane, choose *New-DWORD Value*, type **NoBandCustomize**, and press **<Enter>**. Double-click *NoBandCustomize*, type **1** in the 'Value data' box, and press **<Enter>**.

You may need to log off and then log back on again before the setting will take effect. Now the toolbars in Explorer, IE, and your folder windows will be locked, and you can activate or deactivate them only by editing the Registry. This also removes the 'Lock the Toolbars' command in Windows 2000 and XP.

If you want to prevent anyone from customising the Standard Buttons toolbar, right-click in the right pane of the same Registry entry, choose *New-DWORD Value*, and enter **NoToolbarCustomize**. Set this key's 'Value data' to **1**.

The next time you log on — and thereafter — the Customize command won't appear when you right-click or choose *View-Toolbars* in Windows versions that support this feature (see FIGURE 4).
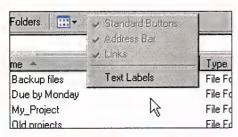
FIGURE 4: Users can't add or remove toolbars or customise the standard buttons when you lock them in place via the Registry.

Some changes will still be possible, however. For example, anyone will still be able to toggle text labels for the Standard Buttons toolbar (right-click and choose *Text Labels*), or (more unfortunately) to drag icons on, off, or around your Links toolbar.
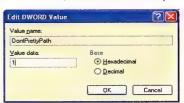
Cap your file names

When you name a folder with eight characters or fewer, Windows 98 changes any all-caps typing to initial capital only. If you want some folder names to have all capital letters for emphasis, open the Registry Editor and go to HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\Advanced. With the Advanced key selected in the left pane, double-click the *DontPrettyPath* icon in the right pane. Change the 'Value data' setting from 0 to **1** and press **<Enter>** (see FIGURE 5).

Folder names entered with all capital letters will thenceforth appear as you typed them, as will eight-character file names (and old DOS files) created with all caps.

FIGURE 5: Stop Windows from changing your all-caps folder names so they appear just as you typed them.

Put Outlook in your tray

If your PC runs Microsoft Office XP and you like to keep Outlook open but minimised most of the time, you may not want the program to take up space on the taskbar when you aren't actually using it. A reader who signed his e-mail only as David points out that a simple Registry edit lets you make Microsoft Outlook appear as an icon in the taskbar tray (the area near the clock), instead of as a taskbar button, when minimised.
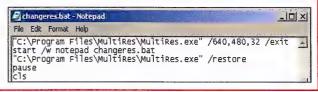
Begin by opening the Registry Editor and navigating to HKEY_CURRENT_USER\Software\Microsoft\Office\10.0\Outlook\Preferences. With *Preferences* selected in the left pane, right-click anywhere in the right pane and choose *New-DWORD* Value. Type **MinToTray** and press **<Enter>** to give your new icon a name. Now double-click the *MinToTray* icon, enter **1** in the 'Value data' field, and press **<Enter>**.

If Outlook is running, exit and then restart it. The next time you minimise Outlook, it will disappear from the taskbar and appear as a tray icon. Simply double-click the tray icon to restore it. The Outlook icon appears in both the taskbar and the tray when the application window is open (not minimised), but when you minimise the program, the icon vanishes from the taskbar. ■

Change your resolution on the fly

Some programs work best at a particular screen resolution. This batch file changes your resolution to 640x480 (at 32-bit colour depth), launches a program, and waits until you exit before returning to your original settings. It requires EnTech Taiwan's free MultiRes, so download and install that program from **www.entechtaiwan.com** (or the cover CD) before loading the batch file. The file loads in Notepad, but just change the second line to tell the file to load itself into the program of your choice. Alter the numbers on the first line to change the resolution and the colour depth. The terms "start /w" at the beginning of the second line and "cls" at the end of the program are

necessary in Windows 98 and Me; they're harmless in 2000 and XP. You'll find the batch file (changeres.bat) on the cover CD.

– Lincoln Spector

```
"C:\Program Files\MultiRes\MultiRes.exe" /640,480,32 /exit
start /w notepad changeres.bat
"C:\Program Files\MultiRes\MultiRes.exe" /restore
pause
cls
```

The entertainers

A PC in the lounge room? How about one that lets you watch DVD movies, view and record TV, and listen to digital music? We look at three home theatre PCs, and tell how you can make any system media-savvy. **By Jeremy Torr.**

Microsoft, a company famous for recognising a potential market, has launched a version of XP called Media Center. This OS is designed to help combine a PC with mainstream home entertainment components, and has prompted a surge of vendors to release PCs that blur the gap between computing and home entertainment. They combine the functions of entertainment devices like your TV, VCR and stereo with a normal computer. But how well do they make the transition? Should you buy one?

We test three of the first models on the market from Acer, MSI and Hi-Grade — plus present upgrades that turn any PC into a lounge-room powerhouse (on page 56).

Most ordinary PCs are big and boxy — and they have no business inhabiting a spot in your lounge room. New home theatre PC systems are designed to serve as digital entertainment hubs, marrying the latest hardware and software to provide DVD and digital music playback, photo slide shows, TV, and video recording capabilities. Many of these computers use familiar PC components, so they can be upgraded to give more oomph, unlike most home theatre systems.

The home PC theatre concept isn't entirely new; IPC, Gateway and Packard Bell all tried it a few years back, with mixed success. Most were hampered by an inability to offer basic entertainment and recording capability, and the lack of components that could easily be integrated. Recent hardware developments have solved that problem with DVD-R, TV and radio tuners, surround sound and full multimedia capability all available, potentially offering the functionality of full home theatre.

So, should you get a media centre PC? It depends on what you will use it for. If you want to replace the home theatre system, then the answer would be no. They are not as convenient, simple and versatile as an out-of-the-box entertainment system. If you want a do-it-all space saving communication and media hub for a bedroom or the study, on the other hand, they are the best thing since sliced bread. It's your choice.

TEST SHOWTIME

Acer Aspire RC 502

Housed in a slim, dark and shiny casing, Acer's RC 502 looks like an expensive executive tower PC with some intriguing extras such as front panel media playback controls, a function control knob and a cool-blue LCD alphanumeric display. These allow direct selection of PC, Music (MP3, CD), Video, Pictures, TV or FM Radio operation, in pursuit of Acer's objective of "taking the place of five full blown home appliances".

The keyboard and mouse are stylish chrome and black wireless units, and the 15in LCD monitor matches them well. The three-piece powered speaker system continues the black/chrome theme, and a multi-function remote control completes the input options.

Inside the case all is standard PC, with a Pentium 4 2.4GHz plus 256MB of DDR RAM. It comes with a built-in DVD+RW combo drive, a 120GB hard drive and built-in 2.1 (not surround) sound card. Graphics are taken care of by a tuner card for TV and radio, and an ATI Radeon 64MB card. Connectivity is excellent, with LAN, modem, sound, two front and two back panel USB, two FireWire ports (small and large format), and an impressive line-up of seven memory card reader slots on the front panel.

There is only one spare PCI expansion slot, and one spare RAM slot, too — although it is unlikely you would need to add more, given the comprehensive spec.

In terms of performance, the Acer was a great PC. Windows XP Home is loaded, and the bundled software (AspireFM, AspireTV, Power Director Pro, Power DVD, Quick Burn, Ulead DVD Factory, Win DVD Play and a custom audio equaliser) all add spice to the desktop. No standard apps were included on our review model.

When using the unit as an entertainment hub, things were different. For some reason, Acer has decided to make the RC 502 hibernate between functions. To change from PC to TV operation means a several-second wait while the case display flashes "Configuring", and the monitor unhelpfully shows a "No

Signal" message. Exactly the same happens between the other modes, and is extremely frustrating. Why an immediate switchover like the MSI uses could not be included is not clear.

In the various modes, the RC 502 works well. DVD playback was good but lacked sparkle in both display and sound terms, with a grainy image and reedy sound from the three rather lightweight speakers. CDs and MP3 playback force you to navigate a seriously daggy 1980s' style menu, and the TV tuner was nowhere near as sensitive as the Xperian's.

Other irritations included the lack of ability to use the remote seamlessly across all modes — using Media Player demands you use the mouse to increase volume even though the remote has volume keys. This underscores the central problem with the Acer. It tries hard to integrate PC and entertainment, and only partially succeeds.

As a PC with multimedia add-ons, it is fine; as a Personal Entertainment Centre, it is not.

Hi-Grade Xperian 1700

Hi-Grade has designed a unit that has both PC and entertainment capabilities, but looks like neither. The Xperian is a cool-looking 15in LCD, with side-mounted speakers supported by a hefty grey gunmetal base — and that's it. Simplicity is absolute. Controls are through a wireless keyboard, rechargeable mouse and a full function remote; no wires, connections, or peripherals apart from a single power cable.

The unit features many design smarts, such as the magnetised keyboard storage that doubles as a screen protector. The simple yet effective keyboard offers basic function swap buttons for FM radio, TV, DVD/CD, MP3 and PC operation. The only letdown is the mouse, which looks and feels cheap.

Inside the casings — both behind the screen and in the heavy base — are a Pentium 2.8GHz P4, 256MB of DDR RAM and a 180GB Maxtor drive. As the case is not designed for self-upgrade, it was not possible to inspect the interior, but the specs claim a 5.1 Creative Inspire sound chip and a 64MB ATI

M9 graphics card with one spare slot. A DVD/CD-RW drive is mounted in the side of the display.

The Xperian wins hands down on connectivity, with ports and slots on virtually every surface. There are (on the side) a PC Card slot, two USB ports, TV-in, FM radio-in, a multicard MMC/SD/MS/SmartMedia reader and cable in. On the back of the screen there are LAN, modem, S/PDIF optical, two more USB 2.0, four- and six-pin FireWire, audio in, audio out, and microphone. Phew.

The machine runs on Windows XP Home, and comes with Nero burning software, WinFast TV and FM, WinFast video recording, and Windows Movie Maker. The key advantage is not the software, but the fast mode switching. Press a button on the keyboard or remote, and the app you want is almost instantly available. Some of the front ends are a bit basic, but instant availability is very attractive.

All the controls on the remote work all functions through software. This means mouse, keyboard or remote can be used equally effectively. The TV tuner proved superbly sensitive and stable, and oh-so-simple picture-in-picture TV recording off-air is a joy to use.

DVD playback was excellent using the bundled app, given the small screen. Crisp and without a trace of blur and flicker, it beat the Acer easily. Sound output into a 5.1 system would be the icing on the cake.

Attention to design is everywhere. Little touches such as discreet LCD indicators that only light when you press a control key, stunning sound from the small yet powerful speakers, and no wires unless you want them all make the Xperian a great stand-alone unit. And it is very quiet, with virtually no fan noise — a real plus in a lounge room.

If you need computing capability and entertainment in one neat package, this is the best yet. Now all we need is one with a decent-sized screen.

Unveiling the Seven Signs of Perfection

Introducing the Vetta series, the perfect balance of versatility, style and visual performance.

Perfection – The Viewsonic Vetta Series originated from the finest industrial designers in Finland incorporating minimalist motif using concepts inspired by European architecture. The final piece of work created a new design flag-ship-The Viewsonic Vetta Series

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MSI MEGA

Motherboard maker MSI has taken a different tack than the other makers in this review, and provided a ready-to-roll system that looks like any mini hi-fi system at first glance. It comes with built-in radio and CD playback, a multi-segment LCD front panel with the usual hi-fi lights and knobs, and a very un-PC-like set of audio controls. MSI has added a standard PC motherboard with bundled sound capability behind this non-computing front end.

It comes in a very neat, small format, silver-bronze box that would grace any lounge room, and is equipped with a very generous range of I/O options which all add up to a very attractive package — as long as you don't mind fitting your own CPU, RAM and storage devices.

The basic shell comes with a groovy orange-backlit LCD display that gives info on mode, equalisation, volume, track, name, status, station and more. Front panel buttons operate power, mode, disc eject, play/FF/REV, PC on, and reset. Under a front flap nestle six slots for almost all memory card formats, plus two USB, two FireWire, S/PDIF in, microphone and headphone sockets.

The back panel is similarly well equipped, with sockets for serial, parallel, LAN, modem, two more USB, keyboard and mouse, S/PDIF out, 5.1 sound out, line in and, of course, video out. Inside the case there are one spare AGP slot and one spare PCI slot, and two memory slots to cope with up 2GB of DDR RAM. Sound is provided by the Realtek ALC50 with 5.1 output plus SRS surround simulation. The SiS 651/962 chipset incorporates the video driver, but no TV tuner is included.

As no CPU, hard drive, RAM and CD are fitted, we fitted our unit with a Pentium 4 2.4GHz, 80GB drive, a Yamaha CD-R drive unit, and 256MB of RAM. We used a standard keyboard and mouse, fitted a three-speaker sound output system, and loaded Windows XP Home. When switched on in entertainment mode, the integrated audio functions all worked flawlessly using the remote. There was no time lag whatsoever when mode switching thanks to inputs (tuner, CD, DVD) being hard-wired directly to the sound output. Output volume was higher than average.

When powered up into PC mode, Windows Media Player was used for media playback, and good integration allowed control using the remote for all functions. DVDs were glitch free, but playback quality will depend on the monitor and speakers you choose. Audio can also be played in PC mode, but the hi-fi section cannot operate simultaneously with the PC — an annoying factor.

So, apart from the lack of an included TV card (which seems bizarre in a multimedia system), the MEGA scores extremely high in terms of usability and practicality. It works great as a PC; it works great as an entertainer. Plus, you can upgrade and tweak the PC components to your heart's content without upsetting any of the entertainment aspects.

Fit a massive plasma screen and five powered speakers, and it really is home entertainment-ready. Opt for a small monitor with headphones, and it's the perfect solution for the study.

Are they blockbusters?

These units all purport to cross the line between home entertainment and computing. In reality, they don't. The conflicting demands of entertainment (sit back, switch on, enjoy) and computing (sit close, boot up, choose program, load, open file, concentrate) are thrown into stark contrast when they are both in the same box.

Microsoft created Media Center XP for students and urbanites who live in cramped quarters without room for a computer, a television, and a home theatre system. Even though none of these units uses XP Media Center, most PC vendors have a different vision, positioning their PCs as destined for the lounge room.

However, the only one that comes close is the MSI, which allows you to split the functions much more readily, and comes at a bargain price, too — even if you have to add all the other components.

The Xperian is a superb piece of work, but is very expensive for a PC and its screen is too small for a real home theatre. The Acer is a confusing marriage of technologies with poor integration and sound, and, again, expensive for what it does.

As secondary devices for a kid's room, or in Microsoft's vision of the cramped student pad, home entertainment PCs are fine. But don't think they will take the place of a home theatre just yet.

BUILD YOUR OWN MEDIA CENTRE PC

BY ERIC KNORR

A media centre PC sounds like a compelling proposition — a device that can capture and play back digital audio and video, acting as either a digital-entertainment hub for your existing home theatre or an all-in-one PC-based home theatre for a small room.

You don't need to buy a media centre PC to take advantage of all that digital media goodness. If your current PC has at least a 500MHz processor and 128MB of RAM, it can probably do the job with some upgrades. Add a TV-tuner card and some software to any fairly capable PC, and you'll have a computer that can rival almost any media centre machine. The only thing you won't have is Microsoft's Media Center OS (but then again, as you'll have seen from our reviews, not all 'media centre' PCs come with this OS, either). That's okay, though: several software packages offer similar large-screen interfaces for recording TV and managing digital media.

One thing you will have is some leftover cash — you'll probably spend much less to upgrade a PC than you would on a new media

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COMPUTING ON THE BIG SCREEN

We'll all need high-definition TVs once broadcasters eventually move to digital TV, so a home theatre PC project provides the perfect excuse to start looking at sweet high-res big screens (if you ignore all the controversy over how it was introduced). And if computing in your living room is a priority, the increased resolution of HDTV-ready sets will greatly enhance the experience.

The best and most expensive display would be a 32in or larger HDTV-capable monitor that can serve both as a home theatre screen and as a monitor you can use across the room with a wireless keyboard. If price is no object, get an HDTV monitor that features 720 progressive scan (720p), which in HDTV lingo means 720 lines of noninterlaced vertical resolution. That is, the lines are scanned sequentially on each pass, creating a sharper image than the interlacing method of scanning every other line per pass. With 720p and the right graphics card settings, you'll get an image close to the crisp 1024x768 resolution of PC monitors.

On the other hand, you'll save considerable cash by choosing an HDTV monitor that tops out at 480p or 1080i (the i stands for interlaced) instead. This usually results in a cramped 640x480 desktop resolution, though you may be able to tweak your graphics card to display 1920x1080 interlaced. The resulting image quality can vary widely depending on the monitor you're using.

A $US30 shareware program called PowerStrip, from EnTech Taiwan (**www.entechtaiwan.com**), can increase your odds of success by providing endless tweaking options for most graphics cards. Also consider asking a boutique home theatre shop if you can bring in your PC and try out HDTV displays to make sure your settings work.

As for connecting an HDTV-ready display, the best case is that both your HDTV monitor and your graphics card have a digital video interface connector, so you can simply run a DVI cable between them. Otherwise, your only HDTV input will probably be a component-video connector; several graphics boards have optional VGA-to-component-video adapters.

HDTV Displays have a dizzying array of video connectors. Here's how to sort them out.
A Composite video: standard connector that delivers the worst quality
B S-Video: slightly better than composite
C DVI connector: convenient, high-quality, high-definition connector
D Component video: typical high-definition connection

---

centre system. And while upgrading can be a very complex process, it's the best way to get an audio/video setup with exactly the right mix of hardware, software, and consumer electronics.

Digital video recording is probably the most compelling element of the home theatre PC puzzle, but it's not all you must consider. You'll need the right balance of high-quality sound hardware and speakers, plenty of storage space, and a convenient means of selecting and controlling media. Depending on how you plan to use your PC, you may want to consider upgrading each of these elements.

If the idea of opening your PC worries you, there are other products on the market to consider. Adaptec, for instance, has a package called VideOh! DVD Media Center that includes a PAL TV tuner, MPEG-2 hardware encoder, software for personal video recording (with access to an online program guide) and applications for creating DVDs and video CDs. The USB version sells for $400 and the PCI one for $350 (**www.adaptec.com.au**).

Get your graphics going

Creating a media-capable machine starts with graphics hardware. Your home theatre PC needs to be multitalented — able to record *The Simpsons*, and then play it back on your television. Plus, you'll occasionally want to view a Web page or Word document. A home theatre PC's graphics system must handle several tasks, such as capturing video and tuning in TV signals, as well as displaying video on a high-definition or analog TV set.

First, check your graphics card for an analog video, or TV-out, port. The port usually comes in one of two types — S-Video or composite video — and sometimes both. S-Video produces

somewhat sharper images than composite video, and all but the cheapest TVs take S-Video input.

If your graphics board has a TV-out port and you're otherwise happy with your graphics performance, you can simply add a separate $155 PCI or USB TV tuner, such as Hauppauge's PCI-based WinTV Go (**www.newmagic.com.au**) or ATI's TV Wonder VE (**www.ati.com**), to tune in and capture analog video. For $155, you're looking at a barebones card that captures audio in mono only. More expensive cards come with a remote control and include support for stereo audio capture. If you have satellite service or digital cable, however, you'll need the ability to change channels on your set-top box automatically — which requires a device known as an IR blaster that emulates the remote controls for consumer electronics. DVR (digital video recorder) software maker SnapStream sells an IR blaster as an accessory for $US35.

Buyers looking for a new graphics card can turn to several products that pack a TV tuner onto a standard board. ATI's All-In-Wonder line, for example, features such boards built around several of the company's graphics chips, from blazingly fast models like the 9700 Pro (and the imminent 9800 pro) down.

Once the hardware's ready, you need to install and configure your DVR software. We like SnapStream PVS 3 (**www.snapstream.com**), a popular DVR software package that sells for $US100 (although it does not support Australian TV program listings), but there are several other options, including InterVideo's WinDVR 2 (**www.intervideo.com/jsp/WinDVR_Profile.jsp**). Most TV-tuner cards ship with DVR software included. If you choose to install a different program, make sure it supports the tuner or capture device you've purchased.

UPGRADE CHECKLIST: HOME THEATRE PCS

Here's a list of what you need to turn your PC into a fully-featured home media centre.

COMPONENT	MINIMUM	IF YOU...	THEN CONSIDER UPGRADING WITH...
Video	A graphics board with TV-out; TV-tuner or video-capture card	...have a graphics board with TV-out	...USB or PCI TV-tuner card
		...don't have a graphics board with TV-out	...all-in-one graphics board with TV tuner
Sound card	A sound card with digital out	...plan to hook up to a home theatre receiver	...standard card with digital out
		...plan to use your PC as a home theatre setup	...high-quality, DVD-Audio-capable sound card
Speakers	None if PC is connected to a home theatre	...plan to use your PC as a home theatre setup	...5.1-speaker set
Storage	80GB	...have an 80GB or larger hard disk	...rewritable DVD drive
		...have a smaller hard disk	...as above plus 80GB to 250GB hard disk
DVR software	Bundled with TV tuner	...aren't happy with your tuner's DVR software	...SnapStream or comparable third-party application
Remote control	n/a	...have a digital set-top box	...IR blaster for set-top box control
		...plan to use your PC in the lounge room	...RF remote; wireless keyboard and mouse

CRTs, LCDs, and TVs, oh my!

A standard PC monitor works fine for a bedroom or a small apartment, but it won't do to have your friends and family gathered around the old 15in CRT for your classic *Seinfeld* marathon.

With most TVs, you'll have to settle for an interlaced 480-line image driven by your graphics card's TV-out connection. That's fine for watching recorded TV programs, but the screen image may look pretty fuzzy when you're computing. In that case, you may want to opt for two displays: the existing TV for home theatre, and perhaps a 15in LCD for Web surfing, e-mailing, and configuring.

Want to avoid the whole updgrade thing altogether? Adaptec's $400 VideOh! DVD Media Center USB edition will save you the hassle but will give your PC lots of the functionality.

If you already have an HDTV-capable set or you're thinking about getting one, you might not need a separate monitor because a wide range of sharper display settings will be available. For more information on choosing and hooking up an HDTV-ready monitor, see "Computing on the big screen", on page 58.

Sound possibilities

Any home theatre worth its salt needs at least five speakers, including a subwoofer for complete DVD surround sound and perhaps some occasional big-screen gaming. The best way to do it if you're looking at a lounge room setup is to run your PC's sound out to a home theatre receiver using a digital audio connection. In that case, almost any sound card with a coaxial or optical Sony/Philips Digital InterFace (S/PDIF) output on the PC side will do. The $195 SoundBlaster Audigy from Creative Labs will work just fine.

If you don't plan to hook up your PC to a receiver, you might not get enough wattage for lounge room home theatre. A good sound card and powered speaker set, however, can fill a small-to medium-sized room with good-quality sound. Among sound cards, one of the best values is Creative Labs' SoundBlaster Audigy 2, which sells for about $250. If you hate opening your PC, consider M-Audio's Sonica Theater (**www.elfa.com.au**), an impressive-sounding external $169 sound card that connects to your system via USB port.

You have an abundance of choices for PC-based home theatre speakers. Logitech's $695 Z-680 5.1 speaker set, for example, can pump out sound that rivals most home-theatre-in-a-box systems. Less-expensive surround speaker sets such as Creative's $299 Inspire 6.1 6600 are also available.

Remote control
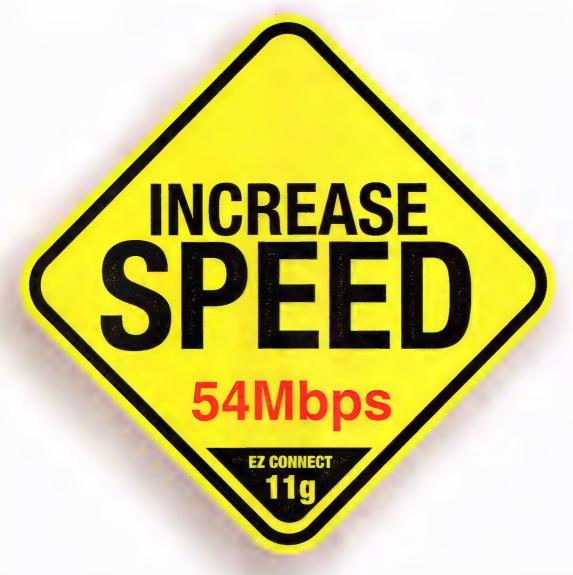
Unless you like the idea of keeping a wired mouse and keyboard on your coffee table, you're going to want a better way to control your lounge room PC. Many TV-tuner cards come with a remote that's capable of controlling DVR software.

Of course, you'll probably want to use your remote to control other software as well. The $US49 ATI Remote Wonder (**www.ati.com**) is one of the most popular units around. It's an RF remote, which means that you don't need to be in line of sight of the receiver for it to work. Unfortunately, it's not very programmable. That's where Girder (**www.girder.nl**), a $US5 shareware package, comes in: with a certain degree of diligence, you can use it to remap the capabilities of the ATI Remote Wonder and other remotes, so you can get exactly the couch-potato control you want. A wireless keyboard and mouse combo like Logitech's $195 Cordless Elite Duo can provide more traditional control without wires.

Storing your recordings

Nothing chews up disk space like video. Recording TV in DVD quality requires about 2.4GB per hour. If you drop down to VHS quality at roughly 500MB per hour, you'll lose a bit of quality, but a 250GB drive (Maxtor and Western Digital sell 250GB models starting at around $700) will let you store a lot of video.

If you want to play that video back in another room, we recommend a DVD-RW or DVD+RW drive. Their write-once DVD-R and DVD+R formats are compatible with most current DVD players. Sony's $649 DRU-500A writes to both DVD-RW and +RW formats, burns CDs, and is a good choice. ■

MUSIC
ENCODING GUIDE

BY WILL HEAD

By now, most of us have a sizeable collection of MP3s cluttering our hard drives. You can claw back some disk space by shrinking file sizes but, as we show here, there's an art to compressing tracks so they sound as good as the original.

You can hardly fail to have noticed that the computer industry is keen to have us believe the PC is the most exciting thing to enter the lounge room since the gramophone. We're as cynical as you about a PC being anywhere near as desirable as a suitably expensive set of stereo components, but we do like the idea of being able to call up any track we fancy from our music collection at will.

There's plenty to be said for having your entire music collection stored in one place. There's no need to hunt down that elusive disc, you can change albums while lounging on the sofa, or change to random play and rediscover forgotten gems.

Copying tracks to your PC is easy, but however capacious your system, how can you be sure they're all going to fit? And if you do squeeze them all on, will you be able to multitask or will the PC be so clogged up with data it almost collapses?

Compression is the answer. It's what makes audio files small enough to share and, when copying from CD to your PC, is what the software does to the original track. Often, your PC or the recording and playback software you use automatically selects the compression format used, so you may not be aware of the process. If you want to transfer a lifetime's collection of listening pleasure to your PC so you've got a digital jukebox of musical memories, it's as well to know something about the competing compression formats.

OOH, AH, JUST A LITTLE BIT

While a range of possible methods can be employed for compressing and encoding tracks, it's also down to the individual to select the level of quality. This is dictated by the bit rate — how much information makes up the compressed track.

There's obviously some trade-off between file size and getting a faithful reproduction of the original track. This will be dictated by the amount of hard disk space you have in which to store the music collection if copying to PC or, alternatively, the capacity of your portable digital audio player.

You'll also need to consider a few other factors when archiving your own music collection on a PC. CD ripping tools such as Microsoft's Windows Media Encoder can be downloaded for free, while a number of dedicated MP3-making packages can be bought off the shelf. Even a relatively small collection of 100 CDs or so is still going to take a fair amount of time to encode, regardless of the format to which you decide to convert them.

There are many music compression schemes available, all with different quality levels, so making the right decision isn't easy. And if you pick the wrong one at the outset, it's going to mean ripping all those CDs again.

With this in mind, we decided to put various codecs (encoder/decoders) to the test. For this, we enlisted the help of a group of willing guinea pigs who took part in a blind listening test. If you've got a lot of CDs to compress but don't know which format to use, or are interested in how the competing codecs fair, read on.

IT AIN'T WHAT YOU DO,
IT'S THE WAY THAT YOU DO IT

In the digital world there are two ways to compress things: lossless and lossy. As their names imply, lossless compression doesn't lose any of the original data whereas lossy compression discards unnecessary data that, once removed, can't ever be recovered. Lossless compression provides a faithful replica of the original data while lossy is a close approximation.

CREATING OUR SAMPLES

To encode the MP3, WMA, Ogg and SHN samples we used the following programs: Lame encoder, Microsoft Windows Media Encoder, Ogg Drop and mkwACT.

You can find details of the various settings used under 'How the codecs compared' (below), and for links to the various programs see 'Programs used' on page 66.

Once the file was encoded we then converted it back to a WAV file using dBpowerAMP Music Converter. The survey was completed by 186 people.

For a summary of which files were used for which samples and the amount of compression, see 'File summary' on page 66.

To explain how the different approaches work, consider the following phrase: "PC World is a great magazine and has a vast number of interesting reviews and gives expert technology advice". A lossless approach to compressing that phrase would be to replace the word 'and' with '&': "PC World is a great magazine & has a vast number of interesting reviews & gives expert technology advice".

This reduces the phrase from 108 characters (including spaces) to 104 — admittedly not the most efficient compression method, but if you replace other sets of repeating characters with symbols you could compress it further. Taking the compressed phrase and converting the '&' characters back to 'and' gives you back the original phrase without loss of data.

The lossy approach would give something similar to the following: "PC World is a good magazine with lots of good reviews and expert advice". As you can see, the overall result is a close approximation of the original but only requires 71 characters. However, in this case there's no way to recover the original phrase from the compressed one.

With lossless compression you retain the original data at the expense of file size, while lossy discards redundant data to increase compression. When it comes to compressing music, the various codecs work in the same way.

Lossless codecs replace patterns of data with shorter symbols while lossy codecs discard unnecessary or redundant information such as frequencies inaudible to the human ear. Lossy codecs also have a quality setting that allows you to control how much data is removed.
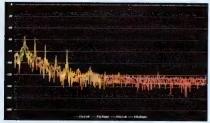
HOW THE CODECS COMPARED

The survey was broken down into two sections. The first compared a compressed file against the original and the second compared three files compressed to the same amount against each other. For the first section we used the following codecs: MP3, WMA and Ogg Vorbis, which are all lossy codecs, and WMA Lossless and SHN (Shorten), which are both lossless. For the lossy codecs we used two settings — one at a high quality and another at a lower quality.

The quality of a lossy codec is dictated by the bit rate, which specifies how much information is used per second of audio and is measured in kilobits per second. You can choose between a CBR (constant bit rate) for the whole file or a VBR (variable bit rate), which uses less compression for more complicated parts and more compression on simpler parts. With VBR you specify a quality setting for the file.
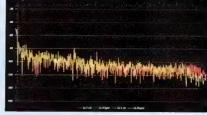
RESULTS FOR ALL SAMPLES

SAMPLE 1

Codec:	WMA VBR high quality
Setting:	variable bit rate, 75% quality
Compressed file:	1b
Quality:	5.69
Compression:	9.11
Compatibility:	7.00
Total:	7.27

SAMPLE 2

Codec:	OGG low quality
Setting:	quality setting 0
Compressed file:	2b
Quality:	6.19
Compression:	9.58
Compatibility:	4.00
Total:	6.59

SAMPLE 3

Codec:	SHN Lossless
Setting:	n/a
Compressed file:	3b
Quality:	5.15
Compression:	2.91
Compatibility:	2.00
Total:	3.35

SAMPLE 4

Codec:	MP3 128Kbps
Setting:	-b 128 -m s -lowpass 19.5 -q 0
Compressed file:	4a
Quality:	4.40
Compression:	9.09
Compatibility:	10.00
Total:	7.83

SAMPLE 5

Codec:	OGG high quality
Setting:	quality setting 5
Compressed file:	5b
Quality:	5.70
Compression:	8.85
Compatibility:	4.00
Total:	6.18

SAMPLE 6
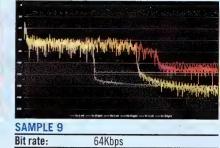
Codec:	WMA Lossless
Setting:	variable bit rate, 100% quality
Compressed file:	6a
Quality:	4.39
Compression:	3.74
Compatibility:	2.00
Total:	3.38

SAMPLE 7
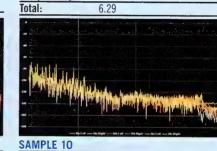
Codec:	WMA 64Kbps
Setting:	constant bit rate, CD quality
Compressed file:	7a
Quality:	5.20
Compression:	9.53
Compatibility:	8.00
Total:	7.58

SAMPLE 8

Codec:	MP3 VBR high quality
Setting:	-r3mix
Compressed file:	8b
Quality:	4.90
Compression:	8.94
Compatibility:	9.00
Total:	7.61

SAMPLE 9

Bit rate:	64Kbps
MP3	
File:	9b
Percentage best:	19.39
Percentage worst:	53.06
Quality:	1.63
Compression:	9.55
Compatibility:	10.00
Total:	7.06
WMA	
File:	9c
Percentage best:	52.02
Percentage worst:	20.41
Quality:	8.06
Compression:	9.52
Compatibility:	8.00
Total:	8.53
WMA	
File:	9a
Percentage best:	29.59
Percentage worst:	26.53
Quality:	5.31
Compression:	9.55
Compatibility:	4.00
Total:	6.29

SAMPLE 10

Bit rate:	256Kbps
MP3	
File:	10a
Percentage best:	28.57
Percentage worst:	39.18
Quality:	3.94
Compression:	8.18
Compatibility:	10.00
Total:	7.37
WMA	
File:	10c
Percentage best:	35.71
Percentage worst:	25.77
Quality:	5.99
Compression:	8.16
Compatibility:	8.00
Total:	7.38
WMA	
File:	10b
Percentage best:	35.71
Percentage worst:	35.05
Quality:	5.07
Compression:	8.23
Compatibility:	4.00
Total:	5.76

MP3 VBR is defined on a scale of zero to nine, with zero being the best. WMA uses a percentage — 100 per cent being the best – while Ogg Vorbis uses a scale of -1 to 10, with 10 being the best. For the second section of the survey we used MP3, WMA and Ogg Vorbis at high quality and low quality. A full breakdown of the various codecs and quality levels is as follows:

SECTION ONE

- MP3 CBR 128Kbps (low quality)
- MP3 VBR Quality setting 1 (high quality)
- WMA 64Kbps (low quality)
- WMA VBR 75 per cent (high quality)
- Ogg Quality setting 0 (low quality)
- Ogg Quality setting 5 (high quality)
- WMA Lossless
- SHN Lossless

SECTION TWO

- MP3, WMA, Ogg CBR 64Kbps
- MP3, WMA, Ogg CBR 256Kbps

READING THE RESULTS

The first eight sets of samples compare a compressed file with the original, while the final two compare three different compression schemes at two different compression levels.

SAMPLES ONE TO EIGHT

The Codec gives a brief description of the compression scheme and quality setting used for each file. The Setting shows how we compressed the file for each example. The File refers to which file (a or b) was the compressed one used in the survey.

FREQUENCY: the chart (see page 68) shows the frequency analysis of the file in question — basically a breakdown of the various frequencies that make up the resulting file. The original file is plotted in red with the compressed file plotted in yellow. Any variation of the yellow line from the red shows where data has been lost. In the case of the lossless formats, the yellow line follows the red exactly and no red is visible.

QUALITY: we've assigned a quality score to each sample based on the percentage of respondents who said the compressed file sounded better. For example, if 75 per cent of respondents thought the compressed file sounded the best, we've given it a score of 7.5.

COMPRESSION: the compression score is calculated on the size of the compressed file compared to the original. If the original file was 5MB and the compressed file was 1MB, the reduction in file size is 80 per cent (the original file size minus the compressed file size as a percentage of the original), which gives it a compression score of eight.

COMPATIBILITY: finally we have assigned a score to compatibility. This is a purely subjective figure which has been based on the available hardware and software support on the market for the various file formats. We have assigned the scores as follows:

Constant bit rate MP3: 10
Variable bit rate MP3: 9
Constant bit rate WMA: 8
Variable bit rate WMA: 7
Ogg: 4
Lossless WMA: 2
SHN: 2

PROGRAMS USED

- **dBpowerAMP Music Converter** — www.dbpoweramp.com/dmc.htm
- **Lame Encoder** — www.dors.de/razorlame
- **mkwACT** — www.etree.org/mkw.html
- **Ogg Drop** — www.vorbis.com/download_win.psp
- **Windows Media Encoder** — www.microsoft.com/windows/windowsmedia/9series/encoder

FILE SUMMARY

SAMPLE	CODEC	COMPRESSED FILE	ORIGINAL SIZE (KB)	COMPRESSED SIZE (KB)
1	WMA VBR 75 per cent	b	5631	502
2	Ogg quality 0	b	5751	239
3	SHN	b	5230	3706
4	MP3 CBR 128Kbps	a	5398	490
5	Ogg quality 5	b	5283	609
6	WMA lossless	a	6551	4100
7	WMA CBR 64Kbps	a	5600	263
8	MP3 VBR quality 1	b	5391	572
9a	Ogg CBR 64Kbps	a	5157	232
9b	MP3 CBR 64Kbps	b	5157	234
9c	WMA CBR 64Kbps	c	5157	248
10a	MP3 CBR 256Kbps	a	5765	1048
10b	Ogg CBR 256Kbps	b	5765	1022
10c	WMA CBR 256Kbps	c	5765	1062

Fixed-rate codecs get a slightly higher score than variable-rate ones which don't tend to be supported on older devices. MP3 does better than WMA because more players support it. Ogg gets just four because hardware players rarely read it. The lossless codecs also score poorly because they are designed as archive formats rather than for playback.

SAMPLES NINE AND 10

Results for samples nine and 10 (which are shown on page 68) are laid out in a similar way to those for one to eight (the compression, compatibility and total scores are calculated in exactly the same way as samples one to eight), but there are a few exceptions.

FREQUENCY: the chart shows the frequency analysis as for samples one to eight, except in this case the Ogg file is plotted in red, the WMA in yellow and the MP3 in white.

QUALITY: the quality score for samples nine and 10 is made up from the percentage of people that thought it sounded best minus the percentage of people that thought it sounded worst. We then add five to the score to avoid negative values. For example, if 50 per cent thought it sounded best and 20 per cent thought it sounded worst, this would give a score of three then add on five to give a final score of eight.

As the difference between best and worse scores was less for higher bit rates, the quality scores between samples nine and 10 aren't directly comparable.

PERCENTAGE: the Percentage Best and Percentage Worst scores show how many respondents chose the respective file as being the best or worst sounding.

AND THE WINNER IS...

Which codec is the best depends on which characteristic is more important to you — quality, compression or compatibility. To make it easier to find the most suitable codec for you, we've made three graphs that compare quality against compression, quality against compatibility and compression against compatibility.

The graphs (see right) use the quality, compression and compatibility scores for samples one to eight. For each graph, the value nearest the top right-hand side gives the best trade-off between the two factors. So, if quality and compression are the most important factors to you, then Ogg at a low-quality setting is the most suitable.
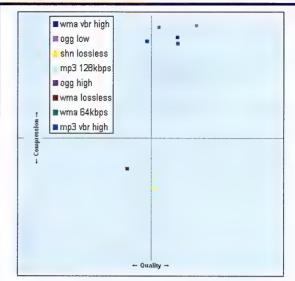
If, on the other hand, you're more concerned with compression and compatibility, then 128Kbps MP3 easily works out as the favourite option. Interestingly, though, there's no perfect trade-off between quality and compatibility, with four possible formats and no discernible winner.

Taking all factors into account — that is, quality, compression and compatibility — MP3 at 128Kbps comes out as the winner. However, this is mainly due to its high compatibility — you'd be hard pushed to find a player that doesn't support it.
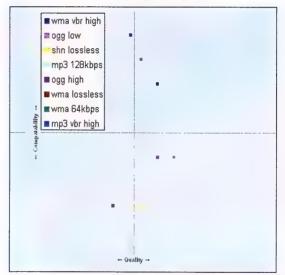
The Ogg Vorbis codec showed promising results for both quality and compression, but unless you're prepared to use only a PC for playback then it's not the best codec to choose. Hopefully, hardware support will improve in the future.

If you're a quality freak then the lossless codecs are the way to go, since all data is preserved. WMA showed a slight advantage over SHN for compression, but there wasn't much in it. If you've decided to opt for a constant bit rate then WMA comes out as the winner both at low-quality 64Kbps and high-quality 256Kbps. ▪
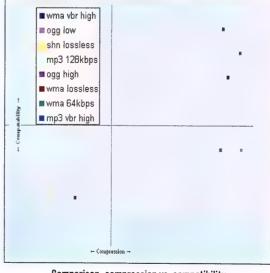
COMPARISONS

Comparison: quality vs. compression

Comparison: quality vs. compatibility

Comparison: compression vs. compatibility

```c
#include <stdio.h>
#include <conio.h>
#define MAX 20

main()
{
static int arr[MAX];
int n, temp, pos;
int i, j, k;

printf("Enter the number of elements : ");
scanf("%d", &n);

printf("Enter the elements now :\n");
fflush(stdin);
for (i = 0; i < n; i++)
    scanf("%d", &arr[i]);

i = 0;
pos = 0;
for (i = 0; i < n; i = (pos + 1))
{
    j = pos + 1;

    /* find out the jth element's appropriate position */
    for (k = 0; arr[j] > arr[k] && k < j); k++)

    /* shift the list elements till the element's position is
     * found */

    temp = arr[j];
    pos =    ;

    printf("\nk = %d", k);

    arr[j] = arr[j - 1];

    arr[k] = temp;

    printf("\tIntermediate o/p is : ");
    for (j = 0; j < n; j++)
        printf("%2d ", arr[j]);
}

printf("\n\nInsertion sorted list is : \n");
for (i = 0; i < n; i++)
    printf("%d ", arr[i]);

getch();
}
```

GET WITH THE PROGRAM

These days, we generally rely on prepackaged software's built-in features to perform specific tasks. In this beginners' guide to programming, we provide a hands-on approach to telling your PC who's boss.

BY JULIAN MOSS

Today's PCs have more power than a supercomputer of the 1960s, are one-thousandth of the cost and sit happily on the corner of a desk. Alongside all this power, modern operating systems and applications hide many complexities, allowing us to instruct a PC simply by selecting items from a menu.

Though there's no longer any need to have programming knowledge, having even the most basic skills will enable you to automate tasks and customise your PC in ways Windows doesn't cater for. With a bit more knowledge you'll be able to write simple applications to perform tasks such as converting data across formats or maintaining a database. You could even create your own games.

Writing a program can be an absorbing and intellectual challenge — indeed, to many people it's a fun hobby. All you need is your PC and some spare time.

HISTORY FILE

Back at the dawn of data processing, when a computer cost the earth and needed an air-conditioned room the size of a supermarket to house it, getting a system to work meant telling it exactly what to do, one step at a time. What's worse, you had to tell the computer in its own language: machine code. If you couldn't speak the lingo then you handed over the job to a programmer.

Digital dawn

The development of the digital computer began in 1945 after the mathematician John von Neumann came up with the concept of the 'stored program computer'. Instead of complex task-specific hardware that needed to be physically rewired for each job, von

Neumann proposed that computer processors should be simple but able to read and store complex sets of instructions called programs.

An important feature of von Neumann's proposal was the conditional control transfer which allowed the result of one instruction to determine which one was performed next. Another of his ideas was the library: a collection of instructions for performing specific tasks that could be used by other programs whenever needed.

In 1949 the first programming language, Short Code, was designed. It suffered from one major disadvantage: the programmer had to convert it by hand into binary machine code (ones and zeroes). Two years later programmer Grace Hopper, working for the US Navy, tired of this tedious task and wrote the first application that would convert programming language into machine code automatically. Called a compiler, this tool speeded up program development.

Modern languages

In 1957 IBM designed Fortran, a language that coded complex calculations but couldn't process data or text. Developed in 1960, Cobol was the first programming language developed for business use. Features included records, which were made up of different types of information such as name, address and date of birth.

One of the side effects of the limited storage capacity of early computers (even in the early 1970s a system might have as little as 64KB of RAM installed) was that programmers identified years using only their last two digits. Some of these programs had a much longer life than originally intended and, as the 1990s drew to a close, fears rose about the consequences of the year changing from 99 to 00. Yes, the Millennium Bug.

Your first Delphi program: designing the window

To demonstrate the principles of visual programming, we'll create a simple conversion utility using Borland Delphi.

1 After starting Delphi, select *File-New, Application*. From the *Standard* tab of the *Component* palette, click on an *Edit* control then select your new application's window, Form1. With the mouse, drag the edit control so that its top and left coordinates both have the value eight and a width of about 180. Using the Object Inspector, change the Text property to '0'.

2 Add, position and resize a ComboBox and a Button in the same manner. Using the Object Inspector, change the ComboBox's Style to 'csDropDownList'. Click the '...' button in the Items property then type a list of conversions to choose from, such as 'Inches to Centimetres' and 'Centimetres to Inches'. For the Button, change its Name property to Convert. Select the form, change its name to Converter, and resize it with the mouse so it fits round the three controls.

Development of algorithmic language, otherwise known as Algol, begun in 1958. Though not used today, Algol pioneered concepts such as block structure and the use of formal grammar to define the syntax of the language: principles that are used in current programming languages. The language Pascal (named after the mathematician Blaise Pascal) is perhaps the closest derivative of Algol. It became popular in the 1980s thanks to Borland's small and ultra-fast Turbo Pascal compiler and is the language behind the company's current Delphi product.

The other major derivative of Algol was a language called C, which was developed in 1972. This was much more cryptic than Pascal and therefore difficult for programmers to read. It was also less strict — the compiler undertakes fewer checks, giving more scope for errors. Nevertheless, C became the most popular programming language because C was used in the UNIX operating system and widely taught in universities.
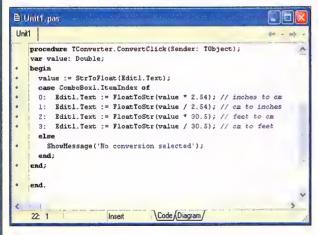
C++, first published in 1983, addressed some of the shortcomings of C. It added support for object-oriented programming, a technique that allowed complex code to be encapsulated in simple-to-use building blocks called 'objects'. Most of Microsoft Windows — and most of the company's other applications — are written in C++.

Your first Delphi program: adding the code

Now we must write the code that will run when the button is clicked. This will convert the number typed in the Edit box, depending on the option that is selected from the drop-down list.


```
procedure TConverter.ConvertClick(Sender: TObject);
var value: Double;
begin
  value := StrToFloat(Edit1.Text);
  case ComboBox1.ItemIndex of
  0:  Edit1.Text := FloatToStr(value * 2.54); // inches to cm
  1:  Edit1.Text := FloatToStr(value / 2.54); // cm to inches
  2:  Edit1.Text := FloatToStr(value * 30.5); // feet to cm
  3:  Edit1.Text := FloatToStr(value / 30.5); // cm to feet
  else
    ShowMessage('No conversion selected');
  end;
end;

end.
```

1 Double-click the button and the code editor will open showing a procedure called TConverter.Convert Click. Add the code so that the finished procedure looks like ours. The line starting '0:' will be used if the first item in the ComboBox list is selected. The formula for '1:' will be used for the second item, and so on.

2 Save your project by clicking the *Save All* button. Select a directory for the project using the buttons beside the Save In: field. Save the main program file as unit1.pas. You'll be prompted to save the project file — change the name to Convert because the EXE file that Delphi creates will be named after this.

Getting down to basics

Basic, which stands for beginner's all-purpose symbolic instruction code, was developed in 1964 as a language to teach programming. Instead of a compiler,

GET WITH THE PROGRAM

Basic used an interpreter that translated program statements to machine code and executed them one line at a time. Basic was commonly used in the first home computers that appeared during the 1970s.

Microsoft was formed in 1974 when Bill Gates and his pal Paul Allen ditched college to develop a Basic interpreter for an early home PC, the Altair.

In 1991 Microsoft released Visual Basic, a tool intended to simplify the development of Windows programs with a graphical interface — something that was difficult in C. It has now grown into a powerful programming tool.

Other variants of Microsoft Basic include Visual Basic for Applications, which is supported by Office programs, and VBScript, a version that can be embedded within Web pages.

Visual Basic programmers start with a blank window or form and create a graphical interface by dropping buttons, edit boxes and other elements onto it. They then write short blocks of code that are executed whenever an event occurs — for instance, when a menu item is selected. Borland used the same model in its Visual Pascal product, renamed Delphi upon its release in 1994.

Java, another C derivative, was released by Sun Microsystems in 1995. Designed so that it would not be tied to any specific hardware, Java was seen as a tool that would lead to the development of portable applications that would run on any computer. This hasn't happened, as Java programs run more slowly and consume more memory than those written for a specific platform.

However, Java is now widely used as a scripting language for Web pages that will run in different browsers on a variety of computers.

UNDER REVIEW

There's a range of tools to help you program — here's a sample:

Windows Scripting Host

www.microsoft.com; included with Windows 98 to XP

If you're interested in programming then there's one tool you can't ignore, as it's already installed on your computer. The Windows Script Host, complete with interpreters for VBScript and JScript (a Java-like language), has shipped with every system since Windows 98.

You can write scripts to perform a variety of tasks, ranging from system management to the automation of your Office applications. Simply type code into a text editor, save it and run it. Unfortunately, this isn't as simple as it sounds. Without development aids such as syntax highlighting (which shows the elements of a program statement in different colours), context-sensitive help and an interactive debugger, getting your script working can be a slow process.

It's possible to use Microsoft FrontPage's Script Editor (see 'Use Microsoft Script Editor to develop VBScripts', below), but

Use Microsoft Script Editor to develop VBScripts

If you have Office 2000 or later you can use Microsoft FrontPage's Script Editor to edit and debug scripts. You'll get the benefits of colour syntax highlighting, help prompts and a debugger that lets you set break points and step through your script line by line. If you have the Script Editor installed on your PC, you'll find it in the folder c:\Program Files\Microsoft Visual Studio\Common\IDE\IDE98. The filename is mse.exe. However, there are a couple of things you need to do before you can use this editor to create VBScripts.

First, you need to enable support for stand-alone script files, since the Microsoft Script Editor was intended only for editing scripts in Web pages. This entails adding a couple of values to the Registry. To make this easier, we've included a file called mse.reg on this month's cover disc. Just double-click the file to make the changes. Next, you must make a file called 'new windows script file.wsf' which contains the following:

```
<job>
<SCRIPT LANGUAGE="VBScript">
</SCRIPT>
</job>
```

Now save it in the folder c:\Program Files\Microsoft Visual Studio\Common\IDE\IDE98\NewFileItems. To save you some work we've created this for you as well, so you can just drag and drop it from the CD.

Start the Script Editor and select *Tools-Options*. Expand the HTML option and click on the *HTML Editor*. Under *Initial View*, start *HTML Pages* and select *Source*. Click *OK* to save the changes.
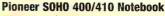
You can now use Script Editor to edit and test VBScripts. To do this, select *File-New File-New Windows Script File*. Type your script code between the tags <SCRIPT ...> and </SCRIPT> in the new file. You must also force the file type extension to WSF when you save the file because the Script Editor defaults to HTM. An unavoidable annoyance is that a browser window starts when you run or debug your script from within the editor. You may see a warning about ActiveX controls on the page, but you can safely ignore this.

The quizmaster

For our VBScript example we've chosen a simple quiz, which you can easily modify to create a fun game or learning aid for the kids.

```
quiz - Notepad
File  Edit  Format  View  Help
Title = "Quiz"
RightAnswers = 0

Ask "Name a small rodent which cats like to catch", "Mouse"
Ask "Name a yellow fruit that monkeys like to eat", "Banana"
Ask "Name the best computer magazine", "PC World"

MsgBox "You scored "&RightAnswers, vbinformation, Title

Sub Ask(question,answer)
        Dim ans
        ans = InputBox (question,"Question")
        If StrComp (ans,answer,vbTextcompare) = 0 Then
                MsgBox "Right!", vbInformation, Title
                RightAnswers = RightAnswers + 1
        Else
                MsgBox "wrong!", vbExclamation, Title
        End If
End Sub
```

❶ Using notepad or any plain text editor (we've used Notepad), type in the code shown above. To avoid duplicating code, we've written a sub-routine, Ask, which asks the question and compares the response with the correct answer. It displays a message to say whether the answer was right or wrong and keeps a running total of the number of right answers.

❷ Save the code you entered as quiz.vbs. To run the script, simply double-click the VBS file. If you made a mistake, you'll get an error message showing the line and character position where the error was found. Correct the mistake and try again. If all is well, the program will ask a series of questions.

this is designed for testing scripts embedded in Web pages and insists on running everything in a Web browser.

Koan Software's useful freeware tool VBS Editor (**www.koansoftware.com/eng_index.htm**) is another option, but it's certainly no substitute for a proper development environment.

It's worth overcoming the difficulties of script writing, though, because it's one of the most useful programming skills you can master. If you fancy giving it a go, visit the Microsoft Windows Scripting Home Page (**http://msdn.microsoft.com/scripting**). Here, you can download the latest version of the software and essential accompanying documentation.

Other useful online resources include the Scripting Guide for Windows (**www.winguides.com/scripting**), Win32 Scripting (**http://cwashington.netreach.net**) and Born's Windows Scripting Host FAQ Page (**http://ourworld.compuserve.com/homepages/guenter_born/wshbazaar/wsh2.htm**).

Borland Delphi
www.borland.com.au; from $198
Modelled on the Visual Basic tool, Borland Delphi follows a standard pattern for visual programming tools. Start by designing the user interface, placing menus, buttons, input fields and so forth on a form. As each element is added, the relevant code is automatically inserted into the source file. This saves an enormous amount of work compared with writing Windows programs in a non-visual language like C.

Written code will be executed when a menu item is selected or a button pressed. Once that's done, you're ready to test it. Compilation is quick and the result is an EXE file. If there are errors, Delphi's debugger makes finding them a cinch. You can step through the program one line at a time and monitor the values of variables as you go.

Delphi is based on Pascal, a good language choice for the novice programmer as its syntax allows the compiler to spot errors that other languages might miss. But Delphi is a professional package capable of developing systems for large enterprises and, as such, it's expensive. The free version must only be used for training and even the Personal edition shouldn't be used for commercial work.

The University of Manchester Institute of Science and Technology has a Computing with Delphi tutorial (**www.me.umist.ac.uk/delphi.htm**). The tutorials at DelphiLand (**www.festra.com/eng/index.html**) are also worth a look.

LCC-Win32
www.cs.virginia.edu/~lcc-win32; free
This free C compiler and development system runs under Windows. It's ideal for the novice programmer but is still a high-quality tool and has been used to develop add-ins for the shoot-'em-up title Quake.

The development environment, called Wedit, lacks frills such as toolbars but has everything you need. You can create both command-line and Windows programs. The former tool is easier for the beginner as you can use the standard functions 'scanf' and 'printf' for input and output.

Wedit has a good debugger, too, which lets you set break points, step through your code and inspect the values of variables if the program doesn't work.

If you want to try your hand at Windows programming, check out Wedit's wizard that creates an initial skeleton program as well as an editor that enables you visually to design your program window or dialogue box. But LCC-Win32 is not a visual programming tool and a lot more work is needed to make a Windows interface function as it should.

If you'd like to try using C, you'll find a great introduction to programming at **www.howstuffworks.com/c.htm/printable**. You should also visit Q Software Solutions (**www.q-software-solutions.com**) which has a short introductory tutorial on using LCC-Win32. Finally, there's some specific information at **www.geocities.com/siliconvalley/station/1177/tutors.html**.

DarkBasic Professional
www.darkbasicpro.com; $US99
DarkBasic is designed specifically for creating 3D games, screensavers and presentations. As such, it requires some reasonably powerful hardware with 3D-accelerated graphics. Created programs run in full-screen mode under DirectX.

DarkBasic's programming language is closer to traditional Basic than Microsoft's versions, so it's fairly easy to learn. The downloadable demo lacks tutorials or examples, though; these are only provided in the full product. The package includes all the tools required to create working programs: a code editor, compiler, debugger and context-sensitive online help for every function and command.

With commands such as 'make object', 'position object' and 'rotate object', you'll be creating programs with animated 3D graphics in no time at all. There's plenty of power to keep you challenged and to produce professional-looking games. It supports textures, and textures and objects can be imported from external designers including a Quake editor.

Newcomers should log on to **www.darkbasic.net**. You'll find tutorials, code snippets and online forums where you can chat with other users. ■

OVER THE RAINBOW
Colour laser printers

Lots of heavy lifting was the order of the day in the Test Centre this month as we looked at 12 colour laser printers from 12 vendors, all ranging between 20 and 40kg in weight and $1549 and $5489 in price. Many companies now offer personal colour laser printers for under $2000, and in most cases these units have a footprint small enough to fit on the average computer desk. Speed and feature sets, as well as upgrade paths, do not have to be sacrificed for size.

Not all the printers reviewed are strictly laser printers. Kyocera and OKI both submitted models that rely on light emitting diodes rather than a laser beam to create images on their drum units, and their quality was superb.

Another advancement has been made in the realm of ink technology, where Fuji Xerox has left behind the traditional, hazardous, toner cartridge in favour of what they call ColorStix. These non-toxic sticks of ink are very easy to install and maintain compared to toner cartridges, and their print quality is just as good.

For the small office that doesn't want to make a capital investment just yet, Tally offers a no-charge printer when a customer purchases a consumable plan for that printer. This means that all the user has to pay for is the ink they consume.

Many printers in this review share the same case and engine designs, but vary slightly in their driver programs, standard features and, of course, pricing.

Tech.Files
Serial ATA drives have caused headaches for many of our readers, leaving them confused when it comes to installing Windows XP on brand new drives because the drive is not being recognised by the system. Spiro Hionis examines this problem in detail and tells you exactly what you need to do to overcome it.

PCs
This month saw quite a bit of movement in the $1500-$3500 PC Best Buys charts, with four new machines from PC Express, Protac, IBM and Dell entering the charts. The Protac system came packed with visual extras such as flashing chipset fan LEDs, side panel window and front-mounted colour-cycling backlit clock/internal temperature display. The IBM and Dell machines were perfect examples of functional corporate computing. The $2899 small form factor IBM A50p required no tools to work with, be it opening the side cover or front panel or replacing PCI cards and drives (plastic securing mechanisms are used). The larger $2519 Dell OptiPlex GX270 was also a solid performer and featured a tool-less clamshell-opening case design, and ships with a great three-year warranty.

Notebooks
With close to 20 notebooks tested for this issue's Best Buys, it was always going to be a competitive month. A total of 10 separate vendors are represented and eight new notebooks have achieved a place in the charts.
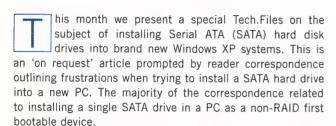
Two of these models (Dell Inspiron 8600 and Hi-Grade Notino C6700) feature the same chassis as previous models from their respective brands, but their internal components have been completely overhauled and both now utilise the Centrino platform.

Is bigger better? This month we investigate the size issue, as two huge 17in widescreen notebooks from Toshiba and ITC enter the charts, in addition to a Sony model with a 16.1in display. If mobility and battery life are more what you need, you'll find a total of five machines using Intel's new low-power Pentium M processor, plus two notebooks featuring AMD's cost-effective Mobile Athlon XP processor. ■

BY SPIRO HIONIS

Install a SATA drive on Windows XP

This month we present a special Tech.Files on the subject of installing Serial ATA (SATA) hard disk drives into brand new Windows XP systems. This is an 'on request' article prompted by reader correspondence outlining frustrations when trying to install a SATA hard drive into a new PC. The majority of the correspondence related to installing a single SATA drive in a PC as a non-RAID first bootable device.

In July, Intel released a programmers reference manual for the 82801EB (ICH5) and 82801ER (ICH5R) SATA controllers. The current ICH5 (Intel Controller Hub 5, which controls the data flow between the system and its hard drives and peripheral devices) controller looks after both the Parallel ATA controller as well as the SATA. It supports three compatible configuration options: four Parallel ATA devices, two Serial ATA devices, or two Parallel ATA and two serial ATA devices. Some new motherboards that are based on the latest ICH5 controller hub have integrated SATA, and this is automatically picked up by the operating system upon installation.

This article applies to older boards that have third party SATA controllers from companies such as Silicon Image and Promise.

The reason for the problem

Before control of the Serial ATA ports was implemented into the ICH5 controller found on the current crop of Intel-based motherboards, Serial ATA ports were accommodated by a third party Serial ATA controller integrated into the motherboard. The third party controllers require their driver to be installed before they will recognise any Serial ATA devices connected to the corresponding ports on the motherboard.

In this case, Windows XP groups the SATA controller into the same category as third party RAID or SCSI controllers. For XP to recognise your new SATA hard disk drive, the required drivers for the SATA controller must be installed via a floppy disk when the operating system is installed.

Unfortunately, most vendors do not supply these necessary

CONNECTING AN IDE DRIVE TO YOUR SATA SYSTEM

As mentioned, many readers want to use their legacy drives in addition to a SATA drive. To do this successfully, after Windows XP has been installed on the SATA drive, shut down your PC and add the legacy drive to an available IDE controller. Be sure you have jumpered it correctly. Start the machine and enter the BIOS. From there, check to see that NO hard disks are selected as bootable devices (i.e., HDD0, HDD1, etc.). If they are, disable them from the boot sequence, or your machine will try to boot from the IDE drive and not the SATA controller. Save the changes and restart your machine.

drivers on a floppy disk, although they can often be found on their motherboard CDs and/or the Internet.

Many readers have kept their IDE hard disks from old PCs and want to use them as backup drives. Despite the common sense of the idea, it further complicates the installation and created two problems. First, your Windows XP installation could not find the SATA hard disk drive on which to install the operating system, or it kept trying to install on your IDE drive (if you were silly enough to connect it before installing the OS on the primary drive). Second, after you set up the SATA drive with Windows XP, you connected the IDE drive from your old system, and now your new system keeps booting from there instead of the SATA drive.

Making it work

Using a 120GB Barracuda SATA V hard disk from Seagate and the Serial ATA-equipped P4 Titan SINXP1394 motherboard from Gigabyte, we endeavoured to achieve a trouble-free system build and Windows XP installation. The rest of the system utilised a 2.4GHz 400MHz FSB Intel CPU, 256MB of PC2100 DDR, and a 64MB GeForce4 Ti 4200 graphics adapter.

Find the drivers

The primary source of problems with this installation will arise if the correct drivers are not available on a floppy, so the first task is to source the correct drivers and create a floppy disk. To do this you must identify your controller (refer to the box 'Get your driver', opposite) and either **a)** download the drivers from the vendor Web site and extract the Windows XP drivers to a floppy disk, or **b)** copy the relevant files from the software CD onto a floppy disk. I found the necessary drivers on the Gigabyte motherboard CD among a myriad of other driver files.

This raised the problem of which files to copy. There will usually be two sets of INF files for your controller. The Gigabyte motherboard uses the Silicon Image controller, so the two INF files are named Si3112.inf and Si3112r.inf. The file name with the 'r' (Si3112r.inf) suffix is for RAID configuration, while Si3112.inf is for a base or single SATA disk configuration. The correct files were found in the Windows XP driver folder, which I copied into the root directory of the floppy disk along with the file called txtsetup.oem. (I did this using another PC.)

The floppy disk does not need to be bootable.

Installing the drive

After the SATA hard drive was installed, I connected it to the interface on the motherboard. Note that, unlike normal IDE drives, there is no 'Master' and 'Slave' controller. There is only one disk per controller in basic non-RAID mode and, as such,

there are no jumpers on the hard disk for 'Master', 'Slave' or 'Cable Select'.

Boot order

I booted up the machine and entered the BIOS, where I configured the first bootable device to be a CD-ROM drive (in order to install Windows). On the same BIOS page I then selected SATA controller as the first controller.

Installing Windows

I started the Windows XP installation from the CD. Early on, a screen instructed me to press the <F6> key if I had a third party RAID or SCSI controller to install. Despite the fact that the installation does not mention or request a SATA driver, you should press the <F6> key. The installation then continued for a few minutes before prompting me specifically for a floppy disk containing the driver of the controller.

With the floppy disk I had created inserted into the drive, the controller was recognised and installed. (Note that you must have placed the correct drivers in the root directory of the floppy for this to succeed.) Once the disk is recognised, the Windows installation proceeded as normal and there were no problems. ∎

GET YOUR DRIVER

You must have the third party SATA controller drivers on a separate floppy disk at the time of the Windows XP installation if you want XP to recognise your hard drive. If XP won't recognise the controller it will refuse to acknowledge your hard drive's existence.

Here are three ways to identify the controller on your motherboard.

1. Refer to the documentation that came with your motherboard, either hard copy or on the motherboard disk.
2. Go to your motherboard manufacturer's Web site after identifying your motherboard model. The specifications will tell you which controller is in use on your particular model.
3. Look at it, because the controller manufacturer and model is often written on top of the unit.

If you find you don't have the SATA controller driver, you may be able to retrieve one from the Internet. In the same way that graphics controller manufacturers provide generic chipset driver sets for download, many SATA controller manufacturers make theirs available online. You may find that the driver provided at the SATA manufacturer's Web site is more current than the one supplied by your motherboard manufacturer and will often be the cure for known glitches.

A quick search of the Internet will reveal a host of SATA controller manufacturers. Just go to their support page where, in most cases, you will find the drivers.

Up-and-coming DVD writers

DVD writers are set to pass CD writers as the standard optical drive for PC manufacturers, but don't expect the trend to hit for another 12 months, industry representatives say.

Mitsubishi technical manager for peripherals Thaddeus du Fresne said DVD burners have approximately halved in price over the past 12 months. This has given consumers an economically viable alternative to CD-RW drives and pushed up product sales significantly.

"They [DVD writers] gained their first appreciable retail presence at around the $1000 market (retail), dropped to sit around $700 for a while (Pioneer A03/A04) and with the recent profusion of competition, have now dropped to $300 to $500 based on brand/specs/format," he said.

Sony product manager, optical drives Gordon Kerr said the fact that DVD writers have hit the "magic price point" of under $1000 for external drives and $500 for internal drives has provoked a massive spike in sales.

Representatives from both the manufacturing and reseller side agreed the introduction of multi-format DVD writers has also allowed consumers to sidestep issues with format compatibility and increased the popularity of DVD writers.

"It seems consumers like the idea of not having to choose between the formats — the pros and cons of plus/minus are complex and difficult to understand," du Fresne said. "The recent introduction of dual models by Pioneer and Sanyo show that this will be the new market direction for some time."

Pioneer national sales manager for multimedia Simon Bartlett said DVD formats have been a hindrance to product sales in the past. "The dual drives (DVD-R/RW and DVD+R/RW) are clearly the most popular [products] right now and our research on consumer DVD media purchases indicates that these are the most dominant formats," he said.

Plus Corporation's managing director Nigel

Fernandes said DVD burners were gaining ground over CD writers, with DVD burners currently featuring in about 10 per cent of all system sales. "I estimate within 12 months CD-RW will be dead, and DVD-RW will be standard."

Bartlett said while the growth in sales of DVD writers right now is "massive", CD writers are starting to wane in terms of growth. "This is the first quarter in living memory that CD writers have declined. I suspect that CD writing technology now has nowhere to go and prices are at rock bottom, so we will see some consolidation in the number of manufacturers," Bartlett said.

According to figures from Bartlett, CD-RW drive sales reached $220,000 in Q2 2003, down about $80,000 from the previous quarter. In comparison, DVD-RW unit sales were worth $37,000, up by around $18,000 from Q1 2003.

Recording speeds will also play an important role in increasing demand for DVD burners, he said. "The next step will be to 8x for DVD-R but for now 4x is standard, and older 2x drives are still circulating at very cheap prices."

Commenting on whether DVD-RW drives would soon overtake combo CD-RW/DVD-ROM drives in PC World's optical drives sweet spot, Kerr said in the previous quarter (April to June 2003) sales of DVD writers reached 40,000 units — the same number of combo drives sold during the same period. He expects DVD writer sales to exceed combo drives in the next quarter. "In terms of interest, DVD-RW has already hit the sweet spot," he said.

Likewise, du Fresne said it could be argued that some users may already perceive DVD writers as having hit the sweet spot by becoming a sub-$400 retail product. "It really depends on the user," he said. "DVD writers are for movie creators and power users. For the average home user there is no need for the extra capacity afforded by DVD, and much cheaper

HOW IS THE SWEET SPOT DETERMINED?

Years of testing for Best Buys reviews has enabled us to recognise patterns that appear in product model lines in terms of functionality, performance and relative purchase price. As a result, we have developed a rule that can quantify and define those products that meet the criteria of a Sweet Spot:

Within a given product category, a model will deliver 85 to 90 per cent of the performance and/or features of the top-of-the-line offering at approximately 40 to 60 per cent of the price.

The best way to explain how the Sweet Spot rule operates is to use an example: a CPU. In this case, let's say we are considering an Intel Pentium 4; there are 15 P4s covering a range of prices and speeds. Using the 40 per cent to 60 per cent price rule (i.e., $320 to $480) narrows the search to the Pentium 4 2.4GHz and 2.6GHz processors.

Industry benchmarks have shown that these two models provide 85 to 90 per cent of the performance of the top 3GHz processor. Performance testing of Best Buys systems allows us to satisfy the performance criteria.

Therefore, the Sweet Spot for Intel's desktop performance processors is the 2.6GHz model.

For more information on how Sweet Spot works, go to **http://pcworld.idg.com.au**.

CD-RW technology is adequate."

But du Fresne, Bartlett and Kerr admitted consumers may have to wait a little longer before DVD burners supersede CD writers.

"My guess is that DVD writers will surpass CD writer sales in 2005 but CD writers will still be around for a while yet," Bartlett said.

According to du Fresne, "It will be a little longer before DVD-RW displaces CD-RW — mainly due to the price difference. Near parity, that displacement will probably occur in the next 12 months."

In the meantime, CD-RW/DVD-ROM combo drives retain the title of **optical drives** sweet spot.

Indeed, sweet spot selections across all component categories remain static this

BY NADIA CAMERON

month. Pricing changes between PC World September and October issues have led to cost increases and decreases for several components.

Prices for 512MB PC2700 DDR **system RAM**, again our pick for the sweet spot this issue, have risen from those listed in our September issue. Prices are now sitting between $145 and $167 — as much as $30 more than last month.

As we mentioned in September, prices per memory module had actually increased by $10 to $20 from those in August. This rise, coupled with the past month's price hikes, means consumers are now paying significantly more for system RAM than they were earlier this year.

Plus's Fernandes says he expects prices will continue to increase over the next two months. Following this, a "flattening of prices" should occur, with a decline expected soon afterwards, he said.

Unlike system RAM, 15in LCD screens have retained their retail price points for this issue and continue to represent the **monitors** sweet spot crown.

As for **CPUs**, both Intel's P4 2.6GHz chip and AMD's Athlon XP 2700+ remain sweet spot favourites for this month, at virtually the same prices as featured in our September issue.

Graphics cards remain unchanged. The NVIDIA GeForce FX 5600-based cards are again our pick this month. For the ATI Radeon-based cards, we initially considered upgrading from the 9200 Pro-based graphics cards to those based on the 9600 chip, but we found prices for these cards were still too high to justify the step up. As a result, Radeon 9200 Pro-based cards uphold the sweet spot for October.

In addition, although popular Radeon 9700-based cards boast performance scores just a pace off the top-of-the-range Radeon 9800, cheaper alternatives like 9200- or 9600-based cards are available.

120GB 7200rpm drives featuring 8MB cache and serial ATA continue to shine in the **hard disk drives** sweet spot, with prices dropping by up to $22 over the past month.

Motherboard sweet spots have also stayed put, with boards based on Intel's 865 and NVIDIA's nForce 2 chipsets again featured in this month's product listings. ■

CPU SWEET SPOT

Price (incl. GST)	Vendor	Vendor URL	Vendor Phone
Intel Pentium 4 2.6GHz (800MHz FSB)			
$375	TI Computers	www.ticomputers.com.au	(02) 9437 5437
$376	Australia Computer Online	www.computeronline.com.au	(02) 9744 6667
$391	Altech Computers	www.altech.com.au	(02) 9735 5655
$393	Plus Corporation	www.pluscorp.biz	1800 007 587
AMD Athlon XP 2700+			
$255	TI Computers	www.ticomputers.com.au	(02) 9437 5437
$260	Australia Computer Online	www.computeronline.com.au	(02) 9744 6667
$268	Altech Computers	www.altech.com.au	(02) 9735 5655
$276	Plus Corporation	www.pluscorp.biz	1800 007 587

MONITORS SWEET SPOT

Product Name	Features (if applicable)	Price (incl. GST)	Vendor	Vendor URL	Vendor Phone
15in LCD Monitors					
Viewtech 15in	Built-in speaker	$449	TI Computers	www.ticomputers.com.au	(02) 9437 5437
BenQ 567	n/a	$465	TI Computers	www.ticomputers.com.au	(02) 9437 5437
BenQ FP547	Beige	$465	Australia Computer Online	www.computeronline.com.au	(02) 9744 6667
LG 1512	Silver	$468	TI Computers	www.ticomputers.com.au	(02) 9437 5437
BenQ FP-547	n/a	$495	Plus Corporation	www.pluscorp.biz	1800 007 587
Polyview CMV CT 522	Brightness 450cd/m2, contrast ration 500:1, 16ms response time	$499	Impact Systems Technology	www.impactsystems.com.au	(02) 9621 2999
Samsung 153V	n/a	$635	Altech Computers	www.altech.com.au	(02) 9735 5655

OPTICAL DRIVES SWEET SPOT

Product Name	Features (if applicable)	Price (incl. GST)	Vendor	Vendor URL	Vendor Phone
CD-RW/DVD-ROM combo drives					
LG	48x24x48x,16x DVD	$108	TI Computers	www.ticomputers.com.au	(02) 9437 5437
LiteOn	48x24x48x, 16xDVD, Nero burning software included	$115	Australia Computer Online	www.computeronline.com.au	(02) 9744 6667
Samsung	52x24x52x CD-RW, 16x DVD	$130	Altech Computers	www.altech.com.au	(02) 9735 5655
Samsung	n/a	$175	Plus Corporation	www.pluscorp.biz	1800 007 587

SYSTEM RAM SWEET SPOT

Product Name	Price (incl. GST)	Vendor	Vendor URL	Vendor Phone
512MB PC2700 DDR				
Apacer	$156	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Seitec PC-2700	$167	Altech Computers	www.altech.com.au	(02) 9735 5655
Elixir 512MB RAM PC2700 (CL2.5)	$145	Australia Computer Online	www.computeronline.com.au	(02) 9744 6667
Elixir 512MB DDR-333MHz CL2.5	$142	PC Express	www.pc-express.com.au	(02) 9584 0568

GRAPHICS CARDS SWEET SPOT

Product Name	Features (if applicable)	Price (incl. GST)	Vendor	Vendor URL	Vendor Phone
NVIDIA GeForce FX 5600-based cards					
Albatron	128MB FX 5600 CP	$239	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Sparkle	128MB FX 5600 DVI	$248	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Chaintech	128MB FX 5600 DVI	$249	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Eagle	128MB FX 5600 DVI	$259	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Leadtek	128MB FX 5600 DVI	$285	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Leadtek WinFast A310TD 128MB	128MB, DVI Dual head, TV-out, VIVO	$290	Australia Computer Online	www.computeronline.com.au	(02) 9744 6667
Sparkle	256MB FX 5600 DVI	$299	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Leadtek	256MB FX 5600 DVI	$329	TI Computers	www.ticomputers.com.au	(02) 9437 5437
X-Micro	256MB	$330	Altech Computers	www.altech.com.au	(02) 9735 5655
Albatron	128MB FX 5600 Ultra 128-bit	$345	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Leadtek	with TV-out, DVI and VIVO	$380	Plus Corporation	www.pluscorp.biz	1800 007 587
ATI Radeon 9200 Pro-based cards					
Gigacube Radeon 9200L (SE)	128MB	$120	Altech Computers	www.altech.com.au	(02) 9735 5655
Gigabyte	128MB, DVI Dual head, TV-out	$130	Australia Computer Online	www.computeronline.com.au	(02) 9744 6667
Sapphire	128MB ATI 9200	$159	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Gigabyte	128MB ATI 9200 TDH	$167	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Gigacube	128MB ATI 9200	$177	Plus Corporation	www.pluscorp.biz	1800 007 587
Gigabyte	128MB ATI 9200 TDH VIVO	$178	TI Computers	www.ticomputers.com.au	(02) 9437 5437

HARD DISK DRIVES SWEET SPOT

Product Name	Price (incl. GST)	Vendor	Vendor URL	Vendor Phone
120GB, 7200rpm, 8MB cache, SATA				
Seagate 120GB 7200	$196	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Western Digital 120GB 8MB ATA 100	$199	Australia Computer Online	www.computeronline.com.au	(02) 9744 6667
Seagate	$238	Altech Computers	www.altech.com.au	(02) 9735 5655
Seagate	$263	Plus Corporation	www.pluscorp.biz	1800 007 587

MOTHERBOARDS SWEET SPOT

Product Name	Features (if applicable)	Price (incl. GST)	Vendor	Vendor URL	Vendor Phone
Intel 865PE-based					
Albatron 865 PE Pro	800MHz FSB SATA	$157	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Gigabyte GA 8IPE1000	800MHz FSB SATA	$176	TI Computers	www.ticomputers.com.au	(02) 9437 5437
Soltek SL-86PE2	SATA, Violet PCB	$178	Altech Computers	www.altech.com.au	(02) 9735 5655
Gigabyte 8IPE1000	FSB800, Dual Channel DDR400, SATA, Audio, ATA133	$185	Australia Computer Online	www.computeronline.com.au	(02) 9744 6667
Gigabyte GA 8IPE1000 Pro	800MHz FSB SATA	$189	TI Computers	www.ticomputers.com.au	(02) 9437 5437
ASUS P4P800	800MHz FSB SATA Gigabit LAN	$219	TI Computers	www.ticomputers.com.au	(02) 9437 5437
ASUS P4P800 Deluxe	800MHz FSB SATA Gigabit LAN	$252	TI Computers	www.ticomputers.com.au	(02) 9437 5437
NVIDIA nForce2-based					
ASUS A7N-266VM	Audio, Video, LAN	$130	Plus Corporation	www.pluscorp.biz	1800 007 587
Gigabyte GA-7N400L1	FSB400, Dual Channel DDR400, Audio, LAN, ATA133	$138	Australia Computer Online	www.computeronline.com.au	(02) 9744 6667
ABIT NF7	ATA133, 10/100 LAN	$181	Altech Computers	www.altech.com.au	(02) 9735 5655

BY RYAN SHAW

Plus Corporation Inspire P32

pc world
BEST BUYS ☆
1 Yet another powerful configuration from Plus Corporation, the Inspire P32 retains the number one position in the Over $3500 category. The Inspire P32 has dark styling across all components and some serious grunt.

The fastest processor available from Intel today, the Pentium 4 3.2CGHz processor makes short work of most repetitive tasks (the 'C' indicates that the processor can run Hyper-Threading and has an 800MHz front side bus speed). Plus Corporation was the first vendor to submit a system with the new processor. A Gigabyte 8IK1100 motherboard based on the 875 chipset showcases a great feature set. Slotted into the motherboard are two memory modules of 512MB DDR400 Kingston memory configured in dual-channel mode, and two 120GB Seagate Barracuda SATA hard disks striped via RAID 0 give a maximum capacity of 240GB. A 128MB DDR Gigacube 9800 Pro graphics card requires an external power supply via a Molex connector to power up.

Two optical drives bundle with this system: a Pioneer A06 DVD+/-RW drive and a DVD-ROM drive. The Pioneer drive allows users to make use of the two writing formats available, the plus and minus, removing the problem of compatibility issues. The integrated Gigabit network adapter (10/100/1000) takes care of network connectivity and a PCI 56Kbps modem occupies one PCI slot. Three PCI brackets located at the rear of the system feature Hi-Speed USB 2.0, FireWire and audio for connecting other peripherals.

The Cooler Master case featured with this system offers good expansion possibilities and is one of the best cases we have seen in the Test Centre. Not only is it rugged and well designed, but the black mirror finish is a nice touch. Three case fans were installed in the case and the one at the rear has blue LEDs. Another device that emits a blue light — a 350W Antec Smart Blue power supply — is housed in the top of the case and provides more than adequate power.

Under testing, the Inspire P32 returned some of the highest scores ever produced by any system (see tables for results). This system is definitely targeted at hardcore gamers, budding movie makers and graphic artists who require that extra power.

The wireless keyboard and mouse combo lets users move away from the traditional position in front of a computer. A 19in Samsung 191T SyncMaster LCD monitor has the same dark styling and provides a clear and concise display. The Altec Lansing 221 speakers that ship with the Inspire P32 also match the system styling and are one of the best 2.1 speaker sets available.

The Inspire P32 is priced at $5900, ships with a three-year on-site warranty. The high price tag may place this system out of reach of most users, but those who can afford the price will revel in the brute strength.
Pros: Sturdy case, excellent graphics performance
Cons: Front-loading ports were not connected
Target: Multimedia or gaming PC

Plus Corporation Astra H31

2 The Astra H31 has dark, chic styling and lights within the case. It would definitely appeal to the gamer, audio enthusiast or digital video buff, and the included components will meet any of these needs.

The system showcases some of the latest components including a Pentium 4 3.06GHz processor (with front side bus speed of 533MHz), 1024MB of PC2700 DDR SDRAM and two 120GB Serial ATA Seagate Barracuda hard disks configured via RAID 0 to give a maximum capacity of 240GB. An included Sony DRU500A DVD+/-RW optical drive gives the user the choice of both types of DVD format. A 128MB DDR PowerColor Radeon 9700 Pro occupies the AGP slot and includes ports on the rear bracket for VGA, S-Video and DVI.

The case design is very solid and is a little weighty due to its ruggedness. A side panel window is included in the package, giving users the chance to look inside and see all the working parts of a PC. To complement the blue PCB design of the motherboard, a blue quad-LED Cooler Master case fan serves as an exhaust at the rear of the case. An Antec 480W True Blue power supply also has blue LEDs within the PSU for extra illumination.

Shipping with a three-year on-site warranty and priced at $4795, this system is definitely targeted at all enthusiasts.
Pros: Fast performer, dark styling
Cons: Case a little heavy
Target: Gaming PC

Dell Dimension 8300

2 The successor to the Dimension 8250, the 8300 features some of the latest components available. Targeted at gamers, digital video enthusiasts and audiophiles, this system is well priced at $3999, considering the included components. Powered by a Pentium 4 3GHz processor with 800MHz front side bus speed, the 8300 packs some serious computing power. A Dell ELX motherboard, based on the Canterwood 875P chipset, houses the processor and is supported by two DIMM modules of 256MB PC3200 DDR SDRAM, totalling 512MB of memory.

An NEC ND-1100A DVD+RW drive should meet the needs of digital video enthusiasts, but everyday users can also benefit from the ability to produce their own DVD movies. Located underneath the DVD+RW drive, a DVD-ROM drive will display those newly recorded DVD movies. A powerful graphics card is needed to handle these demands, and the bundled 128MB DDR ATI 9800 Pro R350 is more than adequate.

Dell-branded input peripherals complement the system's dark styling and are comfortable to use. A Dell-branded 18in LCD monitor is also included in the price but Dell could not supply a review unit before we went to print with the initial review.

With a one-year next business day warranty, and toll-free phone support, the Dimension 8300 is a multimedia enthusiast's dream.

Pros: DVD+RW drive, powerful speaker system
Cons: Expansion
Target: Multimedia enthusiast

Xenon Atomic 675x

3 Housed in the familiar sturdy Thermaltake case, the Atomic 675 multimedia PC submitted by Xenon was a strong performer in all fields. The Atomic 675 offers something for everyone: solid 3D performance, dark styling and good build quality were all noticeable aspects of this system.

It features a Pentium 4 3.06GHz processor running at 800MHz front side bus speed, connected to an Intel D875PBZ motherboard based on the 875P chipset. Two of the four available DIMM slots are occupied by 512MB of PC3200 DDR 400 memory, totalling 1024MB of memory installed. An 80GB Seagate Serial ATA hard disk with 8MB cache uses a thinner red data cable and benefits from the fast data transfer speeds. Also featured is a Radeon 9700 Pro graphics adapter with 128MB of DDR memory.

Priced at $4880 and shipping with a two-year RTB limited parts and labour warranty, this system may be a little expensive for the average home user.
Pros: Large ducting for cooling, 875P chipset-based motherboard
Cons: Broken thermal monitoring LCD display, position of front-loading ports high up on the case
Target: Multimedia enthusiast

Plus Corporation Astra H11

4 This is a complete powerhouse. Our review machine came with a Pentium 4 processor that straddles a Gigabyte GA-8PE667 Ultra 2 motherboard, which is based on Intel's 845PE chipset. It has 512MB of DDR PC2700 memory, an

ATI Radeon 9700 Pro graphics adapter, and two 120GB SATA hard disks striped to give a total capacity of 240GB. The machine also comes with a DVD-ROM drive and a Pioneer DVD-RW drive.

This system features a case that is popular among gamers, the Xaser II model. It's very sturdily built and offers possibilities for expansion. Three pre-installed case fans keep a steady airflow throughout the case and the CPU fan can be controlled via the switch in the top 5.25in bay. The colour coding of the input peripherals works well with the NEC 17in LCD display. This machine might be out of reach for the average user due to its high price tag of $4475.
Pros: Powerful configuration, solid case design, DVD-RW drive
Cons: Broken thermal monitoring LCD display, position of front-loading ports high up on the case
Target: Gaming PC

$1500-$3500

Infocom Gaming Beast 1.2

pc world BEST BUYS★ **1** Similar to the Gaming Beast that has been in charts, this Infocom system is targeted at gamers and LAN'ers. The Gaming Beast 1.2 bundles some excellent features for increased portability and good looks.

A Pentium 4 2.8CGHz processor with an 800MHz front side bus speed sits atop an Albatron PX865PE Pro II motherboard. The motherboard is based on the 865PE chipset and is one of the better 865-based boards we have seen. Two 80GB ATA100 Seagate hard disks take advantage of the onboard IDE RAID and are configured via RAID 0 to give a total capacity of 160GB. Two 256MB DDR400 GEIL-branded DIMM modules occupy two of the four available slots and feature dark blue heatsinks to dissipate heat. The graphics card is a 128MB DDR Gigacube 9800 Pro, the same as in the Inspire P32 system. A 56Kbps PCI modem enables Internet connection, and network connectivity is supplied by a Gigabit network adapter (10/100/1000). There are two BenQ-branded optical drives: a DVD-ROM drive and a CD-RW drive.

Numerous PCI brackets at the rear of the system provide extra connections for peripherals and include ports for Hi-Speed USB 2.0, FireWire, a joystick or game controller, and S/PDIF out. Sound is provided by onboard eight-channel audio, and the Gaming Beast is the first system in the Test Centre to have this configuration.

Fast frame rates were recorded under the UT2003 benchmark, scoring 157fps in the Inferno map and 166fps in the Face3 map. Recorded times for the real world tests were comparable with other systems. A notable improvement was in the hard disk transfer tests, due to the RAID configuration.

The Antec Lanboy case still comes standard with a carrying strap, enabling users to transport their case easily. The windowed side panel does its best to showcase the working parts of the system, and lights within the case increase the appeal. A small fan with blue LEDs cools the motherboard chipset.

The bundled 15in BenQ FP581s LCD monitor has a light weight, small form factor and clear display. The Logitech Z-640 speakers that are included allow users to experience true 5.1 sound via the onboard audio and offer decent clarity with all types of music. The Logitech input peripherals match the system styling and are very comfortable to use. Priced at $3380 and coming with two-year RTB warranty, this Gaming Beast 1.2 is a gamer's dream system.
Pros: Fully-featured motherboard, responsive speakers
Cons: Carrying strap still needs to be improved
Target: Gaming PC

Trinity International P4 Power Pack

2 A solid offering from Trinity International, the P4 Power Pack performed well in benchmarks and has some terrific components. Scoring 290 in SYSMark 2001, 16595 in 3DMark 2001 SE and 286fps in the Quake 3 timedemo, this system gives some of the more expensive systems in the Over $3500 category a run for their money. To prove the graphics scores were no fluke, testing under UT2003 produced high rates of 155fps and 173fps for the Inferno and Face3 maps, respectively. A DVD writing test was also included in the real world tests to identify the time it takes to write 4GB of data to a blank DVD disc (see table).

The CF2029 case from Chyang Fun Industry is sturdily built and offers excellent expansion. With only one case fan installed, there is provision for another two case fans to be installed at the front and rear. Front-loading ports are present but the FireWire port was not connected, as the motherboard did not support this feature.

The accompanying input peripherals were comfortable to use and the 17in Samsung SyncMaster 753DFX CRT monitor provided an adequate display. Trinity International ships the P4 Power Pack with two-year limited RTB warranty and prices it at $3265. This system would be best described as an all-rounder, targeted at both professional and enthusiast users.

Pros: Rugged case, Gigabit adapter, DVD+/-RW drive
Cons: No FireWire or modem
Target: All-round PC

PC eXpress Invader 2800C

3 **NEW** A solid-performing and well-assembled system, the Invader 2800C comes with nicely organised internal cable work and houses a colour-coded Gigabyte GA-8IK1100 motherboard with an 800MHz FSB that uses an Intel 875P chipset. A 2.8CGHz Intel Pentium 4 processor capable of Hyper-Threading has been included, along with a 120GB Seagate SATA hard disk.

Two 256MB PC3200 DDR SDRAM sticks come with the system and the motherboard's six memory slots have a combined maximum capacity of 4GB.

Two Pioneer optical drives are provided: one a 16x DVD-ROM, the other a DVD writer capable of writing DVD- or +R discs at 4x, rewriting them at 2x, writing CDs at 16x and rewriting CDs at 10x. Put to the test, it took 27min 27sec to burn a 4GB data DVD.

A high-performing PowerColor ATI Radeon 9800 graphics adapter that includes S-Video TV-out and DVI-out on its bracket has been chosen, and it performed very strongly. Results were 16951 in 3DMark 2001 and an average of 174 fps and 154fps in the Unreal Tournament 2003 Face 3 and Inferno maps, respectively.

The metallic silver Antec case features a left-side clear window and retains two free 5.25in bays plus two empty 3.5in bays, as a floppy drive is included. The case covers these drive bays with a hinged door, underneath which two front USB ports that connect to the motherboard are located.

The motherboard allows some serious expansion, there being five PCI slots free, and also provides Realtek AC'97 onboard audio complete with line-out, line-in and microphone connections. In addition, both an RCA and optical S/PDIF are provided by means of motherboard-connected daughter brackets, as are two USB 2.0 ports and both a four-pin and six-pin FireWire connection. Remaining ports include two more USB 1.1 (giving the system a total of eight different USB ports), two PS/2 and two serial. Connectivity is only provided by a 10/100 Ethernet port. Although this system is ideally geared to the likes of LAN gamers who may not need a modem, it wouldn't be much to ask for one on an otherwise stellar $3300 system.

Continuing the machine's cool factor

is the inclusion of a wireless Logitech keyboard, rechargeable wireless MX700 optical mouse and Logitech Z-340 2.1 speakers. A one-year, return to base warranty is included as standard, along with all the CD/DVD burning, game, video editing and playback software you should need to get started.

Pros: DVD+/-RW drive, 3D performance
Cons: No modem
Target: Multimedia enthusiast

Plus Corporation Inspire A36

4 The Inspire A36 from Plus Corporation offers something for all PC users, be it DVD viewing, digital video creation or gaming.

A powerful Pentium 4 3.06GHz processor with 533MHz front side bus speed is connected to a Gigabyte GA-8PE800 Pro motherboard based on the 845PE chipset. One DIMM slot on the motherboard is occupied by 512MB of PC2700 DDR SDRAM, and an 80GB ATA133 Maxtor DiamondMax hard disk provides storage. A PowerColor Radeon 9700 Pro graphics adapter takes care of all things visual and a Samsung-branded CD-RW/DVD combo drive will meet all CD burning and DVD viewing needs.

The bundled Microsoft-branded wireless input peripherals offer high ease of use and portability. An NEC 1760V 17in LCD monitor provides a clear display but would have worked better with the system styling if the casing had been black.

Priced at $3325, with one-year on-site warranty and toll-free phone support, this system is the gamer's or budding digital video enthusiast's choice.

Pros: Wireless input peripherals
Cons: Wiring of speaker satellites
Target: Gaming PC

Infocom M-110

5 The M-110 is not really a graphics workhorse but is suited to office applications and surfing the Internet.

During testing, the M-110 returned favourable results of 234 in the SYSMark

2001 test but scores for 3DMark 2001 SE and UT2003 could have been better. The results indicated that the system is better configured for productivity applications, watching DVD movies and burning CDs than playing video games (see table for full results). The real world tests showed the optical drives to be on par with other systems in the category, and produced times very similar to those of the same drives in the Gaming Beast 1.2.

Once again, the CF 2029 case has been used to house components — good quality, strong build and plenty of room for expansion explain why this case is still a favourite in the Test Centre. Cabling had been tidied to increase the airflow but rounded IDE cables would have increased it even more. Front-loading ports are present, as always with this case, but the FireWire port was not connected because the motherboard does not support it. One case fan was installed at the rear of the system to expel the hot air, and there is provision for extra fans at the front and rear of the case.

Rounding out the system components are Microsoft-branded peripherals and a 17in Phillips 107X CRT monitor. The system retails for $1950 and ships with a two-year RTB warranty, and is aimed at first-time computer owners or people just wishing to purchase a system with newer components.

Pros: Good case design, well priced
Cons: Lack of rounded IDE cables and network port
Target: All-round PC

Acer Veriton 7600G

6 A Pentium 4 2.8CGHz processor running at 800MHz front side bus speed sits snugly on an Acer J88MGL motherboard based on the 865G chipset. Two DIMM modules of 256MB PC3200 DDR memory occupy two of the available four slots. Ample storage space is provided by a 120GB ATA100 Seagate hard disk. If disk space does become limited, the Ricoh DVD+RW drive can back up those extra files. Be warned, though: this Ricoh drive does not support both the plus and minus DVD writing format, so a plus disc must be used when writing to a DVD. A 128MB DDR GeForce FX 5200 occupies the AGP slot and supports ports for VGA, DVI and S-Video.

During testing, the 7600G returned some favourable results for the office-based applications but faltered in the graphics tests. This system is not targeted at gamers, so frame rates — although a significant indicator of performance — are not really important. The real world tests produced some interesting times and results: for example, the Ricoh drive failed to burn a DVD+R disc during testing. Numerous attempts with new blank discs still failed to yield any timed result.

The Veriton 7600G retails for $2999 and ships with a three-year limited warranty (see table). The 7600G is ideal for a home office or corporate space, offering plenty of room for expansion and the security features that are a must for any business environment.

Pros: Case intrusion switch, Gigabit network adapter
Cons: No modem, underpowered speakers, failed to write a DVD+R
Target: Business PC

Protac Excel PF1-28C

7 **NEW** Although it performed slightly below expectations, this system's feature set more than balanced any shortcomings. Built from an ECS Photon PF-1 motherboard utilising an Intel 865PE chipset and wielding a front side bus speed of 800MHz, the PF1-28C benefits from a speedy Intel Pentium 4 2.8CGHz processor. The machine comes with no less than 1024MB of DDR SDRAM running at 400MHz, from a motherboard capacity of 4GB.

The supplied optical drive is a JustLink 52x52x24x CD-R/RW. A 120GB Seagate ATA133 hard disk has been used but thanks to the motherboard's support for Serial ATA, users can opt to upgrade if they wish. This theme of expansion options runs through this system, as another three hard disk and three 5.25in bays remain empty and ready to go. One of the two 3.5in bays contains a floppy disk drive.

The metallic silver and clear plastic case has both pros (very convenient to work in) and cons (can be distracting), although things can be tweaked for preference. A combination of flashing LEDs on the chipset fan that can be seen through the left side window (with a centrally-positioned fan) together with a colour-cycling backlit clock/internal temperature display located on the tower's front could be overwhelming for some users. Still, it is a striking system, and that's certainly a positive.

Inside, we found that even though rounded cables had been used, the cable work could perhaps have been tidied up a little. That said, we were impressed to see an exhaust fan over the CPU and five free PCI slots, even with one used for the modem card.

On the video front, the NVIDIA Ti 4200-based Video Excel GX20-128TV card performed on par and offered VGA-, DVI- and S-Video TV-out connections.

The system's audio ability is courtesy of an onboard C-Media 9737A chip, with both RCA and optical S/PDIF and line-out, line-in and microphone connection on offer.

Single parallel, serial and FireWire ports are accessible at the rear of the machine, as are two six-pin and single four-pin FireWire ports. A total of eight USB ports is available, including two at the front of the machine.

Protac has chosen to include a sleek-looking 17in PanaView Panasonic LCD monitor together with some silver-toned generic 5.1 speakers, keyboard and optical mouse. The $2299 Excel PF1-28C ships with a two-year return to base warranty as standard.

Pros: Gigabit Ethernet
Cons: Generic peripherals
Target: Budget multimedia performance

SATO-Ritmo SN41G

8 The SN41G has some unique features that will be sure to capture any digital photography or DVD viewing enthusiast's attention. Crammed into its small enclosure are an AMD Athlon XP 2200+ processor (running at 333MHz front side bus speed), a Shuttle FN41 motherboard, one DIMM module of 512MB PC2700 DDR SDRAM, and a 40GB Seagate ATA100 hard disk. A GeForce4 MX-based graphics adapter is integrated into the motherboard and there is support for an AGP-based card to be installed later. An MSI DVD-ROM optical drive enables users to view DVD movies at their leisure and a 6-in-1 card reader takes up position in the usual 3.5in floppy drive spot.

The MagView SH570 15in LCD monitor supports wall mounting and has a speaker in the base. A 3.1Mp digital camera, USB memory key and earphones with microphone come with the package.

The system ships with only a one-year RTB warranty and is priced at $2345, so the average user might be better off spending money elsewhere. Although the SN41G does have some unique features, better performance and expandability options need to be considered when purchasing a system of this ilk.
Pros: Small form factor, multimedia card reader
Cons: Expansion and performance issues
Target: All-round PC
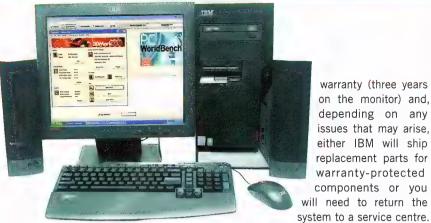
IBM ThinkCentre A50p

9 **NEW** With a special promotional October price of $2899, this particular system (8195-KMA) featuring a 17in ThinkVision L170 LCD monitor is performance-orientated and targeted at users who need speedy productivity application performance. This makes the A50p ideal for office or home study situations, especially as the ThinkCentre is true to its name in that the system runs quietly, allowing users to concentrate.

Built from an IBM motherboard with an 800MHz front side bus and using Intel's 865G chipset, the A50p uses a 3GHz Intel Pentium 4 processor with Hyper-Threading technology and has a total of 512MB of PC2700 DDR SDRAM from two 256MB sticks (4GB is the motherboard's maximum).

Although the motherboard has an onboard graphics chipset, IBM has also used a generic 64MB DDR 8x AGP graphics card based on the NVIDIA GeForce4 MX 440 that provides just a VGA-out (external monitor) port.

Our test unit came supplied with an 80GB ATA100 Maxtor hard disk, although IBM uses a range of selected companies' drives when building systems. The motherboard has two connections for Serial ATA drives.

In addition to a 3.5in floppy disk drive, IBM has included an IBM multi-burner optical drive capable of burning DVD-R discs at 2x, DVD-RAM and DVD-RW at 1x, CD-R at 12x, and CD-RW at 8x, and reading DVD-ROM at 10x and CD-ROM at 32x.

Being such a small form factor, expansion is limited and there is room for only one more each hard disk (3.25in) and 5.25in device. Additionally, there are only two free PCI slots (one is already used by a modem card). Nevertheless, IBM's experience in case design is particularly evident in the following features. The case requires no tools to work with, be it opening the side cover or front panel or replacing PCI cards and drives (plastic securing mechanisms are used). The vertically-mounted hard disk can fold out for easy removal once the front cover is popped off, at which stage you realise that the drive bays are all on a slight slant as part of the front panel's design.

In all, the A50p has eight USB 2.0 ports (two at the front), two PS/2 ports and single serial, parallel, mic-in, line-in and line-out connectors. The latter work with the integrated SoundMAX Cadenza audio chipset that performs perfectly well with the supplied Jazz Infinity stereo speakers.

Also included are a 10/100 integrated network port, IBM optical wheel mouse and an IBM keyboard with good key travel.

The A50p comes with a one-year warranty (three years on the monitor) and, depending on any issues that may arise, either IBM will ship replacement parts for warranty-protected components or you will need to return the system to a service centre. A hidden partition on the hard disk allows rapid restoration in place of a supplied recovery CD.
Pros: Design
Cons: Expansion
Target: Home/study/business PC

Dell OptiPlex GX270

10 **NEW** The GX270 is a fully-featured business machine that has powerful components and features a tool-less clam-shell casing that is easy to work on. Dell targets corporations and institutions with its OptiPlex line of machines, and this model has useful features such as built-in diagnostic utilities and remote management tools to aid maintenance tasks.

It is a fairly large unit, with a footprint measuring 38.5x51cm, that can be positioned on a desk either flat or as a tower via the supplied stand. The case interior is proprietary, but easy to work on. All the unit's drives are attached to the inside of the top cover and reside on rails, which makes them effortlessly replaceable once the cables have been removed. They are connected to Parallel ATA ports on the Dell motherboard, but Serial ATA is also an option for this model.

On the base of the unit, the Intel 865G chipset-based motherboard houses a 2.6GHz Pentium 4 CPU, which has an 800MHz FSB and features Hyper-Threading support, as well as 512MB of PC3200 DDR SDRAM, set up to take advantage of dual channel technology. This configuration, along with a 7200rpm, 40GB Seagate hard drive, helped propel the system to an excellent score of 253 in SYSMark. Its real world MP3 encoding test result is among the fastest we have seen to date and its real world optical drive performance proved to be just as solid in all its supported facets.

In the graphics department, the GX270 relies on Intel's Extreme integrated solution, and this is adequate for the office environment where basic imaging and non-intensive graphics work is required. If more powerful graphics are needed, then an add-in card can be purchased and installed on the motherboard's low profile AGP slot.

Dell has made the PC user-friendly by adding front-loading USB and headphone ports to the case, and its supplied 15in LCD monitor and comfortable keyboard and mouse make it a joy to use. In terms of noise, the GX270 takes advantage of fairly large yet low-powered fans that are barely audible during operation. A large exhaust fan built into the long power supply effectively extracts warm air generated by the disk drives, and the CPU has an equally efficient shroud to redirect unwanted heat towards the rear vent of the system.

All up, a very well-performing and very solidly-built machine that is supported by a three-year on-site warranty and a next business day response.
Pros: Excellent performance, easy to work on
Cons: Large footprint
Target: Corporate environments

SUB-$1500

PC eXpress Avatar 2600

The Avatar 2600 has an AMD Athlon XP 2600+ processor running at 333MHz front side bus speed. The motherboard featured in this system, an ASUS A7N8X,

is based on the NVIDIA nForce2 chipset. Occupying one of the three available DIMM slots on the motherboard is a module of 512MB PC2700 DDR SDRAM. An 80GB ATA100 Seagate Barracuda hard disk, a Samsung DVD-ROM drive and a Lite-On CD-RW drive also accompany the system.

A Chaintech 128MB DDR GeForce4 Ti 4200 graphics adapter, coupled with the nForce2 chipset, supports the newer AGP 8x interface and produced some impressive results in the graphics-intensive tests.

Tsunami-branded keyboard, standard ball-type mouse and stereo speakers are the adequate bundled peripherals. A BenQ G774 17in CRT monitor rounds out the system package, providing an excellent display.

The Avatar 2600 ships with a one-year parts and three-year labour RTB warranty, and is priced at $1450. This system proves that general office applications and 3D gaming can be achieved at a low price point.
Pros: 3D performance, LCD monitor
Cons: Speakers, ball-type mouse
Target: Budget PC

Trinity International P4 Deluxe Pack

The TI P4 Deluxe Pack offers plenty of expansion possibilities and fast 2D performance.

A Pentium 4 2.8GHz processor is housed on an ASUS P4PE motherboard. The motherboard is based on the Intel 845 chipset and contains one DIMM module of 256MB PC2700 DDR SDRAM memory. A 40GB ATA100 Seagate Barracuda hard disk handles storage and an NVIDIA-based 128MB DDR Leadtek GeForce FX 5200

tackles the graphics. An LG-branded CD-RW drive sits in the topmost 5.25in bay, leaving three bays free for expansion. Two PCI bracket modules located at the back of the system support S/PDIF out (Toslink and RCA connections) and a game port for connection of joysticks or gamepads.

The case chassis was sturdy, with plenty of room for expansion. Three 5.25in bays, four hard disk bays and five PCI slots were free, increasing the life span of the case and motherboard. Additional fans can be added, there being room for six (two at the rear and four at the front of the case). Front-loading ports and an LCD temperature-monitoring device are present on the front of the case.

A 17in Mitsubishi 1770 CRT monitor, BenQ keyboard and A4 Tech standard ball-mouse round out the peripherals. The P4 Deluxe is priced at $1450 and ships with a two-year parts/five-year labour RTB warranty.
Pros: Expansion possibilities, warranty
Cons: Graphic performance, standard ball-mouse
Target: Budget PC

Hotmicks Value 2083

Centred on an ASUS A7V8X-X motherboard based on the VIA KT400 chipset, the Value 2083 has an AMD XP 2600+ processor. It also features 256MB of PC2700 DDR SDRAM, a 60GB ATA100 Western Digital hard disk and a 64MB ASUS V9180 graphics adapter based on the GeForce4 MX 440 GPU. Occupying one 5.25in drive bay each are a Lite-On CD-RW and CD-ROM optical drive. The onboard 10/100-network port and internal modem supply network connectivity and the ability to browse the Internet, respectively.

A Hyundai 17in V770+ monitor ships with the system. The included FS-210 speaker system performed poorly during the DVD viewing and gaming tests, struggling with bass and the mid to high tones. The omission of front-loading ports is noticeable.

Nonetheless, the Value 2083 is well priced at $1295 and has a two-year RTB

warranty, making it a good PC system for first-time buyers or students.

Pros: Fast CD-RW drive
Cons: Sub-standard speaker system
Target: All-round PC

Trinity International P4 Dream Pack

4 The P4 Dream Pack continues to showcase TI's ability to produce affordable PC systems. It features a Pentium 4 2.4GHz running at 533MHz front side bus speed and 256MB of PC2700 DDR SDRAM, all housed on an ASUS P4PE motherboard. The unit ships with a 40GB ATA100 Seagate Barracuda hard disk and a Chinatech 128MB DDR GeForce4 Ti 4200 graphics adapter. A Lite-On CD-RW optical drive occupies only one 5.25in bay, leaving two bays free for expansion at a later date.

One noticeable omission in the case design is front-loading ports, although the motherboard does support a total of four USB ports on the I/O panel at the rear of the case.

A 17in Mitsubishi 1770 monitor provides the display, and a BenQ-branded keyboard and A4 Tech standard ball-type mouse are the bundled input peripherals. TI offers Internet support for the system and a two-year RTB warranty.

Pros: Fast CD-RW drive, quality monitor
Cons: No front-loading ports
Target: Budget PC

PMP Beat IT

5 **NEW** Based around an ASUS P4S8X motherboard using SiS's 648 chipset, the PMP Beat IT is powered by a 2.6GHz Intel Pentium 4 processor and 512MB of PC2700 DDR SDRAM (of a maximum 3GB — two slots remain available). Graphics are delivered by an NVIDIA GeForce4 MX 440-based 64MB DDR ASUS v9180 Magic/T graphics adapter with TV-out. The hard disk is a 7200rpm 80GB ATA100 Western Digital with 8MB cache. Combined, all these components helped the system to score as expected

for this price category in the SYSMark 2001 productivity benchmark (237). Compared to most of its price point peers, graphics proved to be a little impotent, with a score of just 4782 returned in 3DMark 2001.

Although of a basic design, the case allows expansion and shouldn't pose a problem to work inside, given the smoothed edges and green-coloured drive bay locking levers. A single LG DVD-ROM/CD-R/RW combination drive resides in one of the case's four 5.25in bays and the included 3.5in floppy disk drive leaves one 3.5in bay free.

Headphone and microphone connections on the front of the case use a pass-through cable to connect to the rear of the machine. Front-located USB ports connect internally to the motherboard. The motherboard itself provides six USB 2.0, two FireWire, two PS/2 and single parallel and 10/100 Ethernet connections. No modem has been implemented. The motherboard also has six PCI slots, none of which has been used.

PMP has opted to complete the system with a 17in Samsung SyncMaster 7535 CRT monitor, Microsoft multimedia keyboard, Microsoft optical wheel mouse and Creative SW 370 2.1 speakers. A two-year warranty applies to the system as a whole, with another year supplied on both the hard disk and monitor. A recovery CD is included.

Pros: Ports and peripherals
Cons: No modem
Target: Budget PC ■

Elias Plastiras and Danny Allen also contributed to this review.

LEGEND

Benchmark Scores	Real World Tests
SYSMark 2001	HARD DISK TRANSFER
3DMark 2001	OPTICAL READ
Unreal Tournament 2003:	OPTICAL WRITE (CD-R)
INFERNO	OPTICAL WRITE (DVD-R)
FACE3	ENCODING

WHAT THE RATINGS MEAN

VALUE RATING The Value Rating is the cumulative score achieved after the evaluation of the system's performance, configuration, features, ease of setup and use, expandability, price, warranty, service and support. The score is the order in which the Best Buys charts are ranked and indicates how much value you are getting for your dollar.

BENCHMARK SCORES The Benchmark Scores are a combination of three different benchmarks:

SYSMark 2001 is an application-based benchmark that simulates everyday usage patterns. For more information, see the web site at pcworld.idg.com.au.

3DMark 2001 SE (build 330) is a widely known industry standard benchmark and simulates several 3D gaming environments under the MAX-FX engine, supported by DirectX 8.1. For more information, see the web site at pcworld.idg.com.au.

Unreal Tournament 2003 is a first person shooter game based on the ever-popular Unreal Warfare engine. Using the two most graphically taxing maps, **Inferno** and **Face3**, the average frames per second is recorded. For more information, see the web site at pcworld.idg.com.au.

REAL WORLD TESTS Rather than only presenting benchmark scores derived from scripts, a mixture of real world tests has been devised by the PC World Test Centre to simulate an average user's daily PC usage. The tests (outlined below) are designed to assist you in determining which PC system might be more suited for particular tasks. These tests will include hard disk, CD writing, 3D game play, and CD ripping/encoding speeds.

Optical read test: A 699MB CD-ROM is copied to the hard disk.
This test is conducted in order to gauge the machine's performance when reading a standard CD-ROM disc. A full disc comprising various data and multimedia files is used so that each drive can perform to its optimum capabilities, reading from the innermost tracks of the CD to the outer tracks. For more information, see the web site at pcworld.idg.com.au.

Optical write test: 699MB of data is written from the hard disk to a CD-ROM.
The same 699MB of data we used for the hard disk test is used to write from the hard disk to a CD-R disc at full speed with verification turned off (using bundled media and software where available).
This test is conducted to review the speed at which each PC in the Best Buys can burn a full data CD. It allows the drive to perform at its optimum capabilities, as data has to be written to the inner tracks and the outer tracks. PC systems equipped with a DVD writing drive are tested using bundled software to burn 4GB of data.
A DNF (did not finish) result refers to the inability during testing to achieve a successful DVD burn despite numerous test attempts and troubleshooting using the software supplied.
For more information, see the web site at pcworld.idg.com.au.

Hard disk transfer test: A total of 4GB of data is copied from the desktop to the root directory of the hard disk.
To test the hard drive capabilities of each PC in the Best Buys, a standard copy test is performed to see how quickly each machine can duplicate data. This is a good indicator of the overall read and write capabilities of the hard drive in a PC. For more information, see the web site at pcworld.idg.com.au.

Encoding test: A standard full-length audio CD is ripped to 192Kbps MP3s.
Our test allows you to see which PC is quickest in turning CD audio tracks into 192Kbps MP3s. This tests both the PC's optical drive and its CPU. For more information, see the web site at pcworld.idg.com.au.

EASE OF USE The Ease of Use column lists each Best Buy PC's features that make it easy to use and setup. Common entries will include recovery discs, setup guides, colour coded ports, front-loading ports and pre-installed bundled software.

EXPANSION Potential for expansion is essential if you want your computer to last more than a few years. This column will highlight the number of drive bays and slots that are available for each Best Buy entry.

PRICE CATEGORIES We have reorganised the way in which the Best Buys PCs are presented. In line with market changes over the last few months, as well as the current Sweet Spots for budget, mid-range and power PCs, new price criteria have been allocated to the Best Buys PCs. The price categories for Best Buys PCs are set at Sub-$1500, $1500-$3500, and Over $3500.
The Sub-$1500 represent the top five Best Buys PCs, the $1500-$3500 the top 10 Best Buys PCs, and the Over $3500 the top five Best Buys PCs in their respective categories. The categories use identifiers to clearly highlight machines recommend for business use, home use, gaming use or all-round use. Below is a guide to the general market for these PC categories.

Note: Pricing is provided to PC World in writing by the PC vendors every month. The vendor is advised that it is expected to honour the price provided. All pricing is inclusive of GST and is effective from the first day of the magazine's cover date.

Over $3500: PCs in this sector are intended for performance enthusiasts or professional business users who need the latest and greatest in CPU, memory and optical drive technology.

$1500-$3500: These mid-range systems can be used for gaming, productivity and general all-round tasks. It is the most competitive category among all vendors and is therefore the largest category in the Best Buys PCs.

Sub-$1500: Aimed at the first-time buyer, student or the budget-minded user.

MAKE/MODEL	VALUE RATING	SPEED RATING	REAL WORLD TESTS	CONFIGURATION

OVER $3500

	MAKE/MODEL	VALUE RATING	SPEED RATING	REAL WORLD TESTS	CONFIGURATION
1	Plus Corporation Inspire P32	184	300 / 18297 / 157 / 191	3m43s, 3m19s, 3m26s, 5m29s, 27m	Intel Pentium 4 3.2CGHz with Hyper-Threading and 800MHz front side bus, 2 x Kingston 512MB DDR400 memory, 2 x 120GB SATA hard disks, 128MB DDR Gigacube 9800 Pro graphics adapter
2	Plus Corporation Astra H31	161	292 / 14840 / 41 / 162	3m2s, 10m31s, 6m55s, 16m47s	Intel Pentium 4 3.06GHz with Hyper-Threading and 533MHz front side bus, 1024MB PC2700 DDR SDRAM, 2 x 120GB SATA hard drive, 128MB PowerColor ATI Radeon 9700 Pro graphics adapter
2	Dell Dimension 8300	161	282 / 15678 / 144 / 176	5m20s, 2m41s, 7m10s, 8m58s	Intel Pentium 4 3GHz with Hyper-Threading and 800MHz front side bus, 512MB PC3200 DDR SDRAM, 120GB Seagate Avalanche SATA hard drive, 128MB DDR Radeon 9800 Pro R350 graphics adapter
3	Xenon Atomic 675x	160	277 / 15116 / 128 / 166	7m58s, 2m46s, 2m41s, 4m3s	Intel Pentium 4 3.06GHz with Hyper-Threading and 800MHz front side bus, 2 x 512MB PC3200 DDR SDRAM, 80GB SATA hard disk, 128MB DDR Radeon 9700 Pro AGP 8x graphics adapter
4	Plus Corporation Astra H11	156	270 / 14877 / 124 / 159	2m55s, 9m56s, 6m58s, 16m59s	Intel Pentium 4 3.06GHz with Hyper-Threading and 533MHz FSB, 512MB PC2700 DDR SDRAM, 2 x 120GB Serial ATA hard drives, 128MB ATI Radeon 9700 Pro graphics adapter

$1500-$3500

	MAKE/MODEL	VALUE RATING	SPEED RATING	REAL WORLD TESTS	CONFIGURATION
1	Infocom Gaming Beast 1.2	164	258 / 16281 / 157 / 166	4m36s, 2m8s, 2m52s, 3m11s	Intel Pentium 4 2.8CGHz with Hyper-Threading and 800MHz front side bus, GEIL 512MB PC3200 DDR SDRAM, 2 x Seagate 80GB ATA100 hard disk, 128MB Gigacube Radeon 9800 Pro graphics adapter
2	Trinity International P4 Power Pack	160	290 / 16595 / 155 / 173	4m15s, 3m25s, 3m25s, 5m33s, 27m	Intel Pentium 4 3GHz with 800MHz FSB, 2 x 256MB PC3200 DDR SDRAM, 2 x 80GB SATA Seagate hard disks, 128MB DDR Sapphire 9800 Pro graphics adapter
3	PC eXpress Invader 2800C	152	265 / 16951 / 154 / 174	4m52s, 3m29s, 2m37s, 5m35s, 27m27s	Intel Pentium 4 2.8CGHz with Hyper-Threading and 800MHz FSB, 2 x 256MB PC3200 DDR SDRAM, 120GB SATA Seagate hard drive, 128MB PowerColor Radeon 9800 Pro graphics adapter
4	Plus Corporation Inspire A36	148	269 / 14269 / 123 / 160	7m51s, 2m15s, 4m4s, 9m9s	Intel Pentium 4 3.06GHz with Hyper-Threading and 533MHz front side bus, 512MB PC2700 DDR SDRAM, 80GB Maxtor hard disk, 128MB PowerColor Radeon 9700 Pro graphics adapter
5	Infocom M-110	123	234 / 7405 / 87	8m33s, 2m7s, 2m44s, 3m50s	Intel Pentium 4 2.4GHz with 800MHz front side bus, 512MB PC3200 DDR SDRAM, 80GB ATA100 Seagate hard disk, 128MB DDR Gigabyte Radeon 9200 Pro graphics adapter
6	Acer Veriton 7600G	122	268 / 5616 / 45 / 54	8m28s, 3m17s, 7m15s, DNF, 16m25s	Pentium 4 2.8CGHz with Hyper-Threading and 800MHz FSB, 512MB PC3200 DDR SDRAM, 120GB ATA100 Seagate hard disk, 128MB GeForce FX 5200 graphics adapter
7	Protac Excel PF1-28C	114	198 / 9903 / 69 / 115	11m, 3m1s, 2m35s, 19m25s	Intel Pentium 4 2.8CGHz with Hyper-Threading and 800MHz FSB, 2 x 512MB PC3200 DDR SDRAM, 120GB ATA Seagate hard drive, 128MB Video Excel GeForce4 Ti 4200 graphics adapter
8	SATO-Ritmo SN41G	113	199 / 2713 / 20 / 33	7m23s, 3m45s, 3m26s	AMD Athlon XP 2200+ with 333MHz front side bus, 512MB PC2700 DDR SDRAM, Seagate 40GB ATA100 hard disk, 128MB DDR integrated GeForce4 MX graphics adapter
9	IBM ThinkCentre A50p	111	242 / 4991 / 30 / 50	11m16s, 6m25s, 3m31s, 7m31s, 27m35s	Intel Pentium 4 3GHz with Hyper-Threading and 800MHz FSB, 2 x 256MB PC2700 DDR SDRAM, 80GB ATA Maxtor hard drive, 64MB NVIDIA GeForce4 MX 440 graphics adapter
10	Dell OptiPlex GX270	104	253 / 2900	12m44, 3m22s, 3m15s, 3m28s	Intel Pentium 2.6GHz with Hyper-Threading and 800MHz FSB, 2 x 256MB PC3200 DDR SDRAM, 40GB ATA hard drive, 64MB integrated Intel Extreme graphics

SUB -$1500

	MAKE/MODEL	VALUE RATING	SPEED RATING	REAL WORLD TESTS	CONFIGURATION
1	PC eXpress Avatar 2600	130	241 / 11806 / 135	6m53s, 3m23s, 6m23s, 11m16s	AMD Athlon XP 2600+ with 333MHz front side bus speed, 512MB PC2700 DDR SDRAM, Seagate Barracuda 80GB ATA100 hard disk, 128MB DDR GeForce4 Ti 4200 AGP 8x graphics adapter
2	Trinity International P4 Deluxe Pack	116	255 / 7951 / 45 / 69	7m48s, 2m37s, 2m45s, 4m36s	Intel Pentium 4 2.8GHz with 533MHz front side bus, 256MB DDR PC2700 SDRAM, 40GB ATA100 Seagate Barracuda hard disk, 128MB Leadtek GeForce FX 5200 graphics adapter
3	Hotmicks Value 2083	110	237 / 5495 / 45 / 28	6m43s, 2m4s, 2m38s, 3m41s	AMD Athlon XP 2600+, 256MB PC2700 DDR SDRAM, Western Digital 60GB hard disk, 64MB DDR GeForce4 MX 440 graphics adapter
4	Trinity International P4 Dream Pack	109	232 / 11265 / 79 / 121	7m56s, 2m37s, 2m45s, 5m7s	Intel Pentium 4 2.4GHz with 533MHz front side bus, 256MB DDR PC2700 SDRAM, Chinatech 128MB GeForce4 Ti 4200 graphics adapter
5	PMP Beat IT	108	237 / 4782 / 29 / 40	6m49s, 2m34s, 4m42s, 7m53s	Intel Pentium 4 2.6GHz with 533MHz FSB, 512MB PC2700 DDR SDRAM, 80GB ATA Western Digital hard drive, 64MB ASUS V9180 GeForce4 MX 440 graphics adapter

TRA FEATURES	EASE OF USE	EXPANSION	PRICE/WARRANTY	ISSUE REVIEWED	VENDOR
[...]msung 191T 19in LCD monitor, Pioneer A06 DVD+/-RW drive (4x DVD+/-R, 2x [...]D+/-RW, 16x CD-R, 10x CD-RW, 12x DVD-ROM, 52x CD-ROM), onboard Gigabit [...]twork adapter (10/100/1000), internal 56Kbps modem, onboard Realtek ALC 655 [...]dio, Altec Lansing 221 speaker, Ability Office suite, Windows XP Home	Front-loading ports, colour-coded mother-board ports, jumperless configuration	4 PCI, 2 5.25in, 1 3.5in, 2 HD free	$5900 3 years on-site	Sep-03	Plus Corporation 1800 007 587 www.pluscorp.com.au
[...]EC 1760 17in LCD, Sony DRU500A DVD+/-RW, 56Kbps internal modem, Intel [...]0/100 network adapter, integrated Realtek ALC650E audio, Altec Lansing 221 [...]peakers, Windows XP Professional	Front-loading ports, colour-coded ports	3 PCI, 3 5.25in, 2 3.5in, 2 HD free	$4795 3 years on-site	May-03	Plus Corporation 1800 007 587 www.pluscorp.com.au
[...]8in LCD monitor, NEC ND 1100A (16x CD-R, 10x CD-RW, 12x DVD-ROM, 4x DVD+R, [...]4x DVD+RW) DVD+RW drive, 16x DVD-ROM drive, internal 56Kbps modem, Intel [...]ntegrated 10/100 network adapter, Creative SoundBlaster Audigy II, Altec Lansing [...]DA995 5.1 speakers, Easy CD Creator, Windows XP Home	Front-loading ports, colour-coded ports, tool-less chassis	2 PCI,1 3.5in, 1 HD free	$3999 1 year next business day	Aug-03	Dell Computers 1800 335 502 www.dell.com.au
[...]7in Hyundai LCD monitor, Sony 52x52x24x CD-RW drive, Sony 16x DVD-ROM drive, [...]nternal 56Kbps modem, onboard Gigabit network adapter (10/100/1000), Creative [...]oundBlaster Live! 5.1 audio, Altec Lansing ACS2200 2.1 speakers, Microsoft [...]ireless keyboard and mouse combo, Windows XP Professional	Wireless keyboard and mouse, front-loading ports, colour-coded ports	2 PCI, 1 5.25in, 1 3.5in, 2 HD free	$4880 2 years RTB	July-03	Xenon Systems 1300 888 030 www.xenon.com.au
[...]7in NEC 1760V LCD monitor, Pioneer DVR-A05 DVD-R/-RW drive, 16x DVD-ROM [...]rive, 56Kbps internal modem, onboard 10/100 network adapter, integrated Realtek [...]LC650E audio, Altec Lansing 221 speakers, 10 game pack, Ability Office Suite [...]002, Norton Internet Security, Personal Firewall, AntiVirus, Privacy control and [...]arental control, Windows XP Professional	Front-loading ports, colour-coded ports, Norton AntiVirus	3 PCI, 2 5.25in, 1 3.5in, 2 HD free	$4475 3 years on-site	Mar-03	Plus Corporation 1800 007 587 www.pluscorp.com.au
[...]15in BenQ LCD monitor, BenQ 52x52x24x CD-RW drive, BenQ 16x DVD-ROM drive, internal 56Kbps modem, onboard Gigabit (10/100/1000) network adapter, integrated 8-channel audio, Logitech Z-640 5.1 speakers, Nero Burning ROM, games package, Windows XP Home	Front-loading ports, carry strap, Nero 5.5, jumperless configuration	3 PCI, 2 5.25in, 1 3.5in, 1 HD free	$3380 2 years RTB	Sep-03	Infocom (02) 9279 4272 www.infocom.com.au
Samsung 753DFX 17in CRT monitor, Pioneer A06 DVD+/-RW drive (4x DVD+/-R, 2x DVD+/-RW, 16x CD-R, 10x CD-RW, 12x DVD-ROM, 52x CD-ROM), 16x LG DVD-ROM drive, onboard Gigabit network adapter (10/100/1000), onboard 6-channel audio, Creative SBS370 speakers, Windows XP Home	Front-loading ports, jumperless configuration, keyboard multimedia controls	5 PCI, 2 5.25in, 1 3.5in, 3 HD free	$3265 2 years RTB	Sep-03	Trinity International Computers (02) 9437 5437 www.ticomputers.com.au
Hyundai ImageQuest Q1910 19in CRT monitor, Pioneer DVR-A06 DVD writer, integrated 10/100 network adapter, integrated Realtek ALC655 AC97 audio, Logitech Z-340 speakers, Logitech M700 cordless keyboard and mouse, Ulead VideoStudio 7, Nero Express, WinDVD 4, Windows XP Home	Front-loading ports, colour-coded ports, Nero Express, comfortable peripherals	5 PCI, 4 5.25in, 2 3.5in, 1 HD free	$3300 1 year RTB	NEW	PC eXpress (02) 9584 0657 www.pc-express.com.au
17in NEC 1760V LCD monitor, Samsung CD-RW/DVD-ROM combo drive, 56Kbps internal modem, onboard 10/100 network adapter, integrated Realtek ALC650E audio, Altec Lansing AVS300 speakers, 10 game pack, Windows XP Home	Front-loading ports, FireWire PCI bracket	4 PCI, 3 5.25in, 1 3.5in, 4 HD free	$3325 1 year on-site	Jun-03	Plus Corporation 1800 007 587 www.pluscorp.com.au
17in Philips 107X Flat CRT monitor, BenQ 16x DVD-ROM drive, BenQ 52x52x24x CD-RW drive, internal 56Kbps PCI modem, integrated AC 97 audio, Logitech Z-340 speakers, Nero 5.5, games pack, Windows XP Home	Front-loading ports, keyboard multimedia controls, Nero 5.5	4 PCI, 2 5.25in, 1 3.5in, 4 HD free	$1950 2 years RTB	Sep-03	Infocom (02) 9279 4272 www.infocom.com.au
17in Acer AL707 LCD, Ricoh MP5125A DVD+RW (4x DVD+R, 2.4x DVD+RW, 16x CD-R, 10x CD-RW, 12x DVD-ROM, 40x CD-ROM), integrated Gigabit (10/100/1000) adapter, integrated AC 97 audio, Acer E-21 speakers, Acer LANscope, NTI CD Maker, Windows XP Professional	Front-loading ports, colour-coded ports	3 PCI, 2 5.25in, 1 HD free	$2999 3 years limited RTB (1st year on site, includes parts and labour; 2nd & 3rd year only includes parts)	Sep-03	Acer 1300 366 567 www.acer.com.au
17in Panasonic LCD monitor, 52x52x24x CD-R/RW drive, 56Kbps internal modem, onboard 10/100/1000 Ethernet, integrated C-Media 9737A audio, 5.1 speaker system, Windows XP Home	Front-loading ports, colour-coded ports	6 PCI, 4 5.25in, 6 3.5in, 4 HD free	$2299 2 years RTB	NEW	Protac (02) 9748 8888 www.protac.com.au
15in Magview SH 570 LCD monitor, 16x DVD-ROM drive, internal 56Kbps modem, onboard Realtek 10/100 network adapter, onboard Realtek ALC650 audio, eAudio SS-6A speakers, 6-in-1 card reader, 3.1Mp VC 3210 digital camera, EP-201V headphones, 32MB USB memory key, MGI PhotoVista 2, MGI PhotoSuite 4, MGI VideoWave 4, Windows XP Home	Small form factor case, front-loading ports, colour-coded ports, 6-in-1 card reader	N/A	$2345 1 year RTB	Aug-03	SATO Technology (03) 9899 6333 www.satotech.com.au
IBM ThinkVision L170 17in LCD monitor, IBM Multi Burner (32x12x8 CD-RW, 10x DVD, 2x DVD-R, 1x DVD-RW, 1x DVD-RAM), 56Kbps internal modem, onboard 10/100 network adapter, integrated SoundMAX Cadenza digital audio, stereo speakers, Lotus SmartSuite, Notes stand-alone client licences, Windows XP Home	Front-loading ports, colour-coded ports, recovery partition, setup poster, comfortable peripherals	3 PCI, 2 5.25, 3 3.5in, 1 HD free	$2899 1 year RTB (3 years on monitor)	NEW	IBM 1800 289 426 www.ibm.com/au
Dell 15in LCD monitor, CD-RW drive, integrated 10/100/1000 Ethernet, integrated audio and built-in speaker, internal tamper switch, Windows XP Pro	Front-loading ports, colour-coded ports, clamshell case enclosure, tool-less design, comfortable peripherals	1 AGP, 2 PCI free	$2519 3 years on-site/next business day	NEW	Dell Computers 1800 335 502 www.dell.com.au
BenQ G774 17in LCD monitor, Lite-On 52x52x24x CD-RW drive, 16x DVD-ROM drive, integrated 10/100 network adapter, onboard Realtek ALC650 audio, Tsunami XX-118A stereo speakers, PC-cillin 2002	Colour-coded ports, front-loading ports, jumperless configuration	4 PCI, 2 5.25in, 1 3.5in, 1 HD free	$1450 1 year parts, 3 years labour RTB	Aug-03	PC eXpress (02) 9584 0657 www.pc-express.com.au
17in Mitsubishi 1770 CRT monitor, LG 52x52x24x CD-RW drive, integrated Intel 10/100 network adapter, onboard audio, 120W stereo speakers, Windows XP Home	Colour-coded ports, front-loading ports, jumperless configuration, CPU thermal monitoring	4 PCI , 3 5.25in, 1 3.5in, 4 HD free	$1450 2 years parts, 5 years labour RTB	Aug-03	Trinity International Computers (02) 9437 5437 www.ticomputers.com.au
Hyundai 17in CRT monitor, Lite-On 52x52x24x CD-RW drive, 52x CD-ROM drive, 10/100 network adapter, internal 56Kbps modem, integrated audio, Milford Sound FS-210 speaker, Canon S200SP printer, PC-cillin 2002, Aquanox, Midnight GT, Nero 5, Windows XP Home	Colour-coded ports	4 PCI, 1 5.25in, 1 3.5in free	$1295 2 years RTB	Jul-03	Hotmicks Computers (07) 3388 4330 www.hmcomputers.com.au
17in Mitsubishi CRT monitor, Lite-On 52x52x24x CD-RW drive, 10/100 network adapter, integrated sound, stereo speakers, Windows XP Home	Colour-coded ports	5 PCI , 2 5.25in, 1 3.5in free	$1325 2 years RTB	Jun-03	Trinity International Computers (02) 9437 5437 www.ticomputers.com.au
Samsung SyncMaster 7535 17in CRT monitor, 48x24x48x CD-RW drive, integrated 10/100 network adapter, integrated audio, Creative SW370 speakers, Windows XP Home	Front-loading ports, colour coded ports, tool-less drive housing	6 PCI, 4 5.25in, 3 3.5in, 1 HD free	$1499 2 years RTB	NEW	Performance Memory and Peripherals (02) 9906 4533 www.pcmemory.com.au

BY DANNY ALLEN

OVER $4000

Hi-Grade UltiNote M6600

pc world BEST BUYS ☆ **1** The UltiNote M6600's optical drive can write DVD-RW and DVD-R discs at 1x and rewrite at 1x, and write and rewrite CDs at 16x and 10x, respectively, in addition to reading DVDs at 8x and CDs at 24x.

Weighing 3.9kg with its power supply and 3.3kg without, the M6600 uses a 2.5GHz Mobile Intel Pentium 4-M processor and has a whopping 1024MB of DDR SDRAM and a 60GB hard disk. Graphics are delivered to the large 15.1in active TFT display by the NVIDIA GeForce4 440 Go graphics controller, itself wielding 64MB of DDR memory.

Included are FireWire, S-Video TV-out and S/PDIF audio line-out connectors, and no fewer than four Hi-Speed USB 2.0 ports.

Support is provided for MultiMediaCard, Secure Digital, SmartMedia and Memory Stick media, one Type II PC Card and an optional mini-PCI card for wireless networking. Additional connectors include PS/2 (for keyboards or mice), microphone-in, parallel, infrared, VGA-out (for an external monitor), 56Kbps modem and Ethernet.
Pros: Features, performance, battery
Cons: No modular drive bay
Target: Multimedia desktop replacement

Acer TravelMate 803LCi

2 The TravelMate 800 series model we tested had a 15in active TFT (with a maximum resolution of 1400x1050) that looked great thanks to the 64MB DDR ATI Radeon Mobility 9000 graphics controller. Using Centrino mobile technology, the 803LCi has a Pentium M processor that runs at 1.6GHz and works with 512MB of DDR SDRAM (of a maximum 2GB), and a 60GB hard disk.

Performance was strong, with SYSMark 2001 returning 226 and 3DMark 2001 returning 7354. Unreal Tournament 2003 testing resulted in an average of 45fps in the Inferno map and 48fps in the Face3 test map.

The machine houses an integrated smart card reader but offers more connectivity options by incorporating four Hi-Speed USB 2.0 ports in addition to single FireWire, S-Video TV-out, VGA-out, parallel and docking connectors. One Type II PCMCIA card can be used, and Acer offers an optional 4-in-1 media card reader.

The unit's 105-minute worst-case scenario battery life score was noteworthy. Acer provides a one-year return to base/repair centre warranty for this $5799 notebook, and offers a two-hour express service turn-around.
Pros: Great performance
Cons: No DVD writer
Target: Portable/desktop replacement

Hi-Grade Notino C6700

3 **NEW** Now a Centrino platform, this 2.9kg (without power supply) machine has a 15.2in wide-aspect display, stylish blue indicator lights and white keyboard.

An NVIDIA GeForce FX Go5200 graphics controller with 64MB of memory is included, allowing a maximum resolution of 1280x854 in 32-bit. The front fascia of the machine houses dedicated CD playback and volume controls, in addition to the microphone-in, line-out and S/PDIF audio-out connectors. The spine accommodates the two Hi-Speed USB 2.0, and single FireWire, Ethernet, parallel, VGA-out, S-Video TV-out and 56Kbps modem ports. The notebook can support one Type II or Type I PCMCIA card.

This high-end $4550 C6700 has a 1.6GHz Intel Pentium M processor,

1024MB of DDR SDRAM and a 4200rpm 80GB hard disk.

The slot-drive integrated into the machine is a 1x1x2x DVD-R/-RW/-RAM writer in addition to an 8x16x10x24x DVD-ROM/CD-R/RW combination drive.

Hi-Grade offers a two-year collect-and-return warranty that includes accidental damage.
Pros: Battery life and performance
Cons: Nothing noteworthy
Target: Multimedia desktop replacement

Sony Vaio PCG-GRT30P

4 **NEW** The PCG-GRT30P features a very large 16.1in display capable of 1600x1200. Using a 2.8GHz Mobile Intel Pentium 4 processor, 512MB of DDR SDRAM, a 60GB hard disk and an NVIDIA GeForce FX Go5200 graphics controller, the GRT30P's scores of 236 and 9284 in SYSMark 2001 and 3DMark 2001, respectively, were very high. Unreal Tournament 2003 testing returned 80fps for the Inferno map and 62fps for Face3.

The notebook also includes a 2x2x DVD±R/RW (supports both + and – formats), 5x24x8x24x DVD-ROM/CD-R/RW combination drive in addition to a Memory Stick slot and support for one Type III or two Type II PC cards. Other

connections include FireWire, TV-out, and VGA-out, while connectivity is delivered by Ethernet, 56Kbps modem and integrated 802.11b wireless networking.

The notebook has two modular bays for a second optical drive or second battery.

Sony offers a one-year parts and labour warranty as standard. However, this is automatically extended another three months if you register with Club Vaio.

Pros: Performance, feature set
Cons: Battery life, weight
Target: Performance desktop replacement

Toshiba Satellite P20

5 | **NEW** The Satellite P20 is one behemoth of a machine. One of two hot new 17in widescreen PC notebooks to make the charts this month, the P20 is capable of a maximum resolution of 1440x900. It is powered by a 2.8CGHz Intel Pentium 4 processor with Hyper-Threading technology running on an Intel 865PE chipset with an 800MHz front side bus. A first in notebooks.

This model P20 used 512MB of PC2100 266MHz DDR SDRAM (of a possible 2048MB). Due to the chipset used, future models should have memory speeds up to 400MHz and processor speeds up to 3.4GHz.

The P20 features a large 80GB hard disk and an NVIDIA GeForce FX Go5200 graphics controller with 64MB of DDR memory. Upon testing, the P20 returned a record high SYSMark 2001 score of 266 and a high score of 6989 in 3DMark 2001.

Also included is a 1x1x DVD-R/-RW, 8x16x10x24x DVD-ROM/CD-R/RW combination drive that can be used in conjunction with the bundled remote control and integrated Harman Kardon speakers. Ports include no fewer than

four USB 2.0 ports, and single S-Video TV-out, VGA-out and FireWire, and support is provided for an SD card and two Type II or one Type III PC Card. Connectivity comes from integrated Ethernet, 56Kbps modem and 802.11b wireless networking. Toshiba offers only a one-year parts and labour warranty as standard.

Pros: Performance, feature set
Cons: Warranty, weight
Target: Performance desktop replacement

$2500-$4000

Dell Inspiron 8600

pc world BEST BUYS **1** | **NEW** Equipped with a 15.4in widescreen display capable of 1280x800 and the first 1.7GHz Pentium M processor we've seen, the Inspiron 8600 also features an NVIDIA GeForce FX Go5650 graphics controller. Not only has Dell included a graphics core more powerful than the GeForce FX Go5200 chip newly included in other notebooks this month, but it has supplied 128MB of video memory as opposed to 64MB.

When tested, the machine scored 232 in SYSMark 2001 and 9953 in 3DMark 2001 — taking the best 3D performance crown. Put to real world use (using Unreal Tournament 2003 for testing), the 8600 blitzed everything, delivering an average of 72fps and 128fps in the graphically-intensive Inferno and Face3 maps, respectively.

Furthering its edge, the Inspiron 8600 is also equipped with 512MB of 333MHz (PC2700) DDR SDRAM (of a 2GB limit), rather than standard 266MHz sticks.

Our $3999 test model featured a 40GB hard disk (up to 60GB drives are available) and rounded out its multimedia feature set with the inclusion of a DVD-ROM/CD-RW combination drive, plus single S-Video TV-out, VGA-out (for external monitors) and FireWire ports. Additional ports include two Hi-Speed USB 2.0 and single serial, parallel, microphone and headphone connectors.

Connectivity needs are met by both Ethernet and a 56Kbps modem, support for one Type I or Type II PC Card, and dual-band 802.11b/a courtesy of an included mini-PCI card. Support is provided for optional Bluetooth and GPRS functionality.

The one-year, next business day on-site

warranty features the same terms described in the Inspiron 5100 review in the Sub-$2500 section.

Pros: Fastest 3D performing notebook
Cons: One-year warranty
Target: Multimedia desktop replacement

Hi-Grade Notino R5400

2 | **UPGRADED** The R5400 has been upgraded this month to a 2.4GHz Mobile Intel Pentium 4-M processor, and its price reduced to $2995. The model retains the 14.1in active TFT display and a 40GB hard disk. The 32MB DDR NVIDIA GeForce4 420 Go graphics setup scored 4069 in 3DMark 2001. The right side of the machine houses an 8x24x8x24x DVD-ROM/CD-R/RW combination drive with a simple locking mechanism, as well as an S-Video TV-out port and three USB 2.0 ports. Other ports include FireWire, Ethernet, 56Kbps modem, VGA-out, infrared, and microphone and headphone sound jacks. Also of note is the R5400's readiness for 802.11b wireless networking.

The R5400 ships with a two-year international warranty, which includes accidental damage.

Pros: Semi-ruggedised casing, splash-proof keyboard, warranty
Cons: Nothing noteworthy
Target: Portable performance

Mitac MiNote 8080

3 | **NEW** Although recording a SYSMark 2001 productivity benchmark score of 190, which is lower than its peers, in addition to just 1808 in 3DMark 2001, the MiNote 8080 more than offsets this with a combination of good pricing ($2599) and features. These include the ability to read Memory Stick, SmartMedia, Secure Digital (SD), and MultiMediaCard media, and the inclusion of an auto-nomous CD player that allows audio

playback without the need to boot into Windows Professional (pre-installed). The playback control buttons can also serve as application shortcut keys.

A Centrino model, the 8080 has a 1.4GHz Intel Pentium M processor, 256MB of DDR SDRAM, a 40GB hard disk and a 32MB Intel Extreme graphics chipset that can take up to 64MB from main memory. With a 14.1in display (capable of a maximum resolution of 1024x768), a weight of 2.7kg (without power supply) and a worst-case scenario battery life of 95 minutes (eight-cell battery), the 8080 is ideal for users who are budget-conscious and seek to be portable without foregoing performance power.

The notebook features a modular drive bay, which is useful if you want to replace the optical drive with a second battery when on the road, and support is provided for one Type II PC Card. An Ethernet connection is included, as is an RJ-11 jack coming from the 56Kbps modem. Additional connections include three USB 2.0 ports and single FireWire, VGA-out, S-Video TV-out, microphone and line-in. A biometric fingerprint ID sensor is an option.

The MiNote 8080 comes standard with a one-year on-site or free pickup and return warranty.
Pros: Battery, features
Cons: 3D performance
Target: Portable performance

ITC Millennia 7000

4 **NEW** The Millennia 7000's 17in widescreen display is capable of a maximum resolution of 1440x900. The machine uses a 3GHz Mobile Intel Pentium 4 processor together with 512MB of 266MHz DDR SDRAM. The hard disk capacity is 40GB and graphics are delivered by a 64MB DDR Mobility Radeon 9000 graphics controller.

At 4.1kg without power supply, the Millennia 7000 comes with an 8x16x10x24x

DVD-ROM/CD-R/RW combination drive and integrated 3.5in floppy disk drive.

Ports include three USB 2.0, and single FireWire, TV-out, and VGA-out, in addition to parallel, serial and PS/2 ports. There are some nice little extras such as application shortcut buttons, dedicated numberpad keys (the first time we've seen this) and a built-in CCD camera with a maximum resolution of 640x480 that comes with basic bundled software.

Although ITC has yet to confirm when its stock will be available, in the future this model could also have a built-in TV-tuner option — the first we've heard of to do so.

Returning solid performance results of 229 in SYSMark 2001 and 6827 in 3DMark 2001, the Millennia 7000 also averaged 36fps and 43fps, respectively, in the Unreal Tournament 2003 Inferno and Face3 maps. Like the Sony PCG-GRT30P, the poor worst-case scenario battery life can be forgiven due to the large screen size. Although just a one-year on-site or free pickup warranty is standard, options are available to extend this.
Pros: Display and form factor
Cons: Battery life
Target: Multimedia and performance desktop replacement

Dell Inspiron 5150

5 Using a 3.06GHz Mobile Intel Pentium 4 processor, this 5150 ships with 256MB of DDR SDRAM and is equipped with a 15in display driven by a 32MB Mobility Radeon 9000 graphics chip.

The unit has a modem port on its right side between the battery compartment and the CPU fan exhaust, and on the left side has a PCMCIA slot that supports one Type I or II Card, plus headphone and microphone jacks.

The 5150 is a two-spindle device (meaning it has space for one hard drive and one optical drive at the same time) and our test model came with a 30GB hard drive and an 8x DVD-ROM drive. The rear of the unit hosts ports for Ethernet, FireWire, VGA, USB 2.0 (two) and TV-out.

The 5150 costs $2799 delivered, and Dell supports the system with a one-year on-site, next business day warranty. This can be upgraded as per the information at the end of the Dell Inspiron 5100 review in the Sub-$2500 section.
Pros: Excellent performance
Cons: No CD burner
Target: Desktop replacement

SUB-$2500

Targa Visionary XP

pc world BEST BUYS 1 For a 15in notebook (with a maximum resolution of 2048x1456), the Visionary XP is quite light at only 3.2kg without power supply. The Visionary XP's large graphic score is due to the notebook's 64MB DDR ATI Radeon 9000 graphics controller, and when tested using Unreal Tournament 2003, the Visionary XP returned an average of 42fps in the Inferno map and 48fps in the Face3 map.

The processor used is an AMD Mobile Athlon XP 2400+ that works in conjunction with 256MB of DDR SDRAM and a 30GB hard disk (up to 80GB hard disks are optional). The notebook has an 8x16x10x24x DVD-ROM/CD-R/RW combination drive, and an external USB floppy disk drive is optional.

Ports include two Hi-Speed USB 2.0 and single FireWire, S-Video TV-out, VGA-out

(external monitor), Ethernet, and 56Kbps modem connectors. A single Type II PC Card is supported. A nice touch is the inclusion of dedicated CD playback controls complete with LCD screen, located on the notebook's front fascia. AKA Technology provides as standard a healthy two-year warranty with the $2299 Visionary XP, covering the entire notebook except for the battery (six-month coverage). A carry case is also included.

Pros: Performance
Cons: Battery life
Target: Multimedia portable/desktop replacement

Dell Inspiron 5100

2 Priced at $2799 two issues ago, this now-$2399 notebook has a 2.4GHz Mobile Intel Pentium 4 (desktop) processor, 512MB of DDR SDRAM and a 40GB hard disk. The 5100 features a CD-R/RW/DVD-ROM combination drive and S-Video TV-out to watch movies on your TV. It incorporates all the functionality that most home and educational users should need, such as an Ethernet adapter, 56Kbps modem and two Hi-Speed USB 2.0 ports. An external monitor can be connected to the VGA-out port, and sound adapters include both a headphone and microphone jack.

Under testing, the 5100 achieved a result of 218 in SYSMark 2001. The 3DMark 2001 score was a healthy 3952.

The Inspiron 5100 comes with a one-year, next business day on-site warranty that can be upgraded to three years on-site for an additional $369 or three years free collect and return for $269. CompleteCover, protecting against accidental damage, can be obtained for another $99 for one year or $170 for three years.

Pros: All-round solid performer
Cons: On the heavy side
Target: Portable/desktop replacement

ASUS L3501

3 **NEW** Although quite hefty and weighing 3.4kg without power supply, the L3501 offsets this with a great feature set at an affordable price.

With a large 15in display, fixed (non-modular) 8x24x16x24x DVD-ROM/CD-R/RW combination drive and integrated 3.5in floppy disk drive, the machine is ideal for desktop replacement use. It also comes with nice extras including

application-shortcut buttons, carry bag and USB optical wheel mouse. The front features autonomous CD player controls, so you can play back CDs without even needing to boot up into the pre-loaded Windows XP Home.

One of only two notebooks in the charts this month with an AMD processor, the L3501 uses a Mobile Athlon XP 2000+ together with 256MB of DDR SDRAM, a 40GB hard drive and an integrated SiS 740 graphics chipset capable of using up to 64MB of memory. Ports include two each USB 2.0 and FireWire, and single S-Video TV-out, and VGA-out (external monitor), plus microphone/headphone jacks and support for one Type III or two Type II PCMCIA cards. Connectivity comes in the form of both Ethernet and an integrated 56Kbps modem.

The $2399 L3501 ships standard with a two-year return to base warranty on the entire notebook except the battery. Distributor Cassa offers a warranty upgrade for $181.50 that covers three years on the notebook, two years on the power supply and one year on the battery.

Pros: Rounded feature set, price
Cons: 3D performance
Target: Budget desktop replacement

Emagen N1000

4 **NEW** This notebook chassis has appeared internationally under the FIC, NEC, Gigabyte and Hi-Grade monikers and shows up in Australia under a few names. For instance, we've previously

seen the Hi-Grade model (dubbed a C1000) in the $2500-$4000 chart with different specifications.

This Emagen N1000 model has the same 14.1in active TFT display and dark blue casework, in this case housing a 1.4GHz Intel Pentium M processor, 256MB of DDR SDRAM, and a 40GB hard disk. Also equipped with an Intel Extreme graphics chipset (capable of using up to 32MB from main memory), the N1000 scored 194 in SYSMark 2001.

The right side is where the integrated 8x16x8x24x DVD-ROM/CD-R/RW drive is located, along with FireWire, microphone and headphone ports. On the rear spine are three USB 2.0 and single Ethernet and 56Kbps modem connectors; the left side of the N1000 supports one Type II PC Card.

802.11b wireless networking is an available option for an additional $119. Retailing at $2499, the N1000 comes with a two-year warranty (first year on-site with same/next day pickup, second year return to base).

Pros: Light weight, performance
Cons: 3D performance
Target: Small form factor performance

Hi-Grade Notino 4400

5 The 4400 has an 8x8x8x24x DVD-ROM/CD-R/RW slot drive and a Pentium 4-Mobile processor running at 2.2GHz. This is coupled with 256MB of DDR SDRAM and a 30GB hard disk. The SiS 650/961 graphics chipset can use up to 64MB of memory from system RAM and delivers a maximum resolution of 1024x768 to the 14.1in active TFT display. The left of the machine houses a slot for one Type II PCMCIA Card, as well as an integrated external volume control, a dual headphone out/AC-97 digital audio out connector, and single FireWire and infrared ports. The opposite side of the notebook is where the integrated 3.5in floppy disk drive is located.

The spine features Ethernet, 56Kbps modem, serial, parallel, VGA-out (for an external monitor), S-Video TV-out and two USB 1.1 connectors.

The Notino 4400 comes with a carry bag, and features a two-year international warranty that includes accidental damage.

Pros: Feature set
Cons: Battery life
Target: Budget portable/desktop replacement ■

MAKE/MODEL	VALUE RATING	BENCHMARK SCORES	REAL WORLD TESTS	CONFIGURATION	EXTRA FEATURES
OVER $4000					
① Hi-Grade UltiNote M6600	105.5	216 / 5346	2m7s / 4m27s / 7m19s / 28m3s	2.5GHz Mobile Intel Pentium 4-M processor, 1024MB DDR SDRAM, 60GB HDD, 64MB DDR NVIDIA GeForce4 440 Go graphics controller, 15.1in active TFT display	2x1x DVD-R/-RW, 8x16x10x24x DVD-ROM/CD-R/RW combination drive, MMC/SD/SmartMedia/Memory Stick reader module, FireWire, 4 USB 2.0 ports, Ethernet, 56Kbps modem, S-Video TV-out, VGA-out, S/PDIF audio-out, external volume control, 802.11b wireless networking, carry case
② Acer TravelMate 803LCi	103	226 / 7354	3m30s / 4m33s / 7m30s	Centrino model: 1.6GHz Intel Pentium M processor, 512MB DDR SDRAM, 60GB HDD, 64MB DDR ATI Mobility Radeon 9000 graphics controller, 15in active TFT display	8x10x8x24x DVD-ROM/CD-R/RW combination drive, 4 USB 2.0 ports, FireWire, Ethernet, 56Kbps modem, VGA-out
③ Hi-Grade Notino C6700	102.5	221 / 6664	33s / 4m30s / 7m30s / 53m	Centrino model: 1.6GHz Intel Pentium M processor, 1024MB DDR SDRAM, 80GB HDD, 64MB DDR NVIDIA GeForce FX Go5200 graphics controller, 15.2in wide-aspect active TFT display	1x1x2x DVD-R/-RW/-RAM, 8x16x10x24x DVD-ROM/CD-R/RW combination drive, 2 USB 2.0 ports, FireWire, Ethernet, 56Kbps modem, S-Video TV-out, VGA-out, CD player control buttons, S/PDIF audio out, 802.11b wireless networking, carry case
④ Sony Vaio PCG-GRT30P	101.5	236 / 9284	1m43s / 3m30s / 7m45s / 27m	2.8GHz Mobile Intel Pentium 4 processor, 512MB DDR SDRAM, 60GB HDD, 64MB DDR NVIDIA GeForce FX Go5200 graphics controller, 16.1in active TFT display	2x2x DVD±R/RW, 5x24x8x24x DVD-ROM/CD-R/RW combination drive, 3 USB 2.0 ports, FireWire, Ethernet, 56Kbps modem, TV-out, VGA-out, Memory Stick slot, 802.11b wireless networking
⑤ Toshiba Satellite P20	101	266 / 6989	1m47s / 4m35s / 10m50s / 33m	2.8CGHz Intel Pentium 4 processor, 512MB DDR SDRAM, 80GB HDD, 64MB DDR NVIDIA GeForce FX Go5200 graphics controller, 17in wide-aspect active TFT display	1x1x DVD-R/-RW, 8x16x10x24x DVD-ROM/CD-R/RW combination drive, 4 USB 2.0 ports, FireWire, Ethernet, 56Kbps modem, S-Video TV-out, VGA-out, SD card slot, CD player control buttons, Harman Kardon speakers, 802.11b wireless networking, remote control
$2500-$4000					
① Dell Inspiron 8600	98	232 / 9953	1m52s / 4m35s / 8m24s	Centrino model: 1.7GHz Intel Pentium M processor, 512MB DDR SDRAM, 40GB HDD, 128MB DDR NVIDIA GeForce FX Go5650 graphics controller, 15.4in wide-aspect active TFT display	8x24x10x24x DVD-ROM/CD-R/RW combination drive, 2 USB 2.0 ports, S-Video TV-out, Ethernet, 56Kbps modem, FireWire, VGA-out, 802.11a, b or g wireless networking, both touchpad and touchstick pointing devices
② Hi-Grade Notino R5400	92.5	208 / 4116	1m52s / 4m29s / 9m10s	2.4GHz Mobile Intel Pentium 4-M processor, 640MB DDR SDRAM, 40GB HDD, 32MB DDR NVIDIA 420 Go graphics controller, 14.1in active TFT display	8x24x8x24x DVD-ROM/CD-R/RW combination drive, 3 USB 2.0 ports, FireWire, Ethernet, 56Kbps modem, S-Video TV-out, VGA-out, spill-proof keyboard, semi-ruggedised casing, Internet buttons, external volume control, 802.11b wireless networking, carry bag
③ Mitac MiNote 8080	90.5	190 / 1808	2m7s / 4m33s / 14m30s	Centrino model: 1.4GHz Intel Pentium M processor, 256MB DDR SDRAM, 40GB HDD, 32MB Intel Extreme graphics chipset (64MB max from main memory), 14.1in active TFT display	8x24x10x24 DVD-ROM/CD-R/RW combination drive, 3 USB 2.0 ports, FireWire, S-Video TV-out, Ethernet, 56Kbps modem, VGA-out, 802.11b wireless networking, autonomous CD player, Memory Stick, SmartMedia, SD, MMC card slots
④ ITC Millennia 7000	88	229 / 6827	2m13s / 4m28s / 9m59s	3GHz Mobile Intel Pentium 4 processor, 512MB DDR SDRAM, 40GB HDD, 64MB DDR ATI Mobility Radeon 9000 graphics controller, 17in wide-aspect active TFT display	8x16x10x24x DVD-ROM/CD-R/RW combination drive, 3 USB 2.0 ports, FireWire, Ethernet, 56Kbps modem, TV-out, VGA-out, integrated 3.5in floppy disk drive, shortcut buttons, dedicated numberpad keys, built-in CCD camera
⑤ Dell Inspiron 5150	87	238 / 4671	2m19s / 6m10s	3.06GHz Mobile Intel Pentium 4 processor, 256MB DDR SDRAM, 30GB HDD, 32MB DDR ATI Mobility Radeon 9000 graphics controller, 15in active TFT display	8x DVD-ROM drive, 2 USB 2.0 ports, FireWire, S-Video TV-out, Ethernet, 56Kbps modem, VGA-out
SUB-$2500					
① Targa Visionary XP	80.5	196 / 7192	2m30s / 4m40s / 8m30s	AMD Mobile Athlon XP 2400+ processor, 256MB DDR SDRAM, 30GB HDD, 64MB DDR ATI Mobility Radeon 9000 graphics controller, 15.1in active TFT display	8x16x10x24x DVD-ROM/CD-R/RW combination drive, 2 USB 2.0 ports, FireWire, Ethernet, 56Kbps modem, VGA-out, S-Video TV-out, carry bag
② Dell Inspiron 5100	78.5	218 / 3952	2m / 4m29s / 8m50s	2.4GHz Mobile Intel Pentium 4 processor, 512MB DDR SDRAM, 40GB HDD, 32MB DDR ATI Mobility Radeon 7500 graphics controller, 15in active TFT display	8x24x10x24x DVD-ROM/CD-R/RW combination drive, 2 USB 2.0 ports, S-Video TV-out, Ethernet, 56Kbps modem, FireWire, VGA-out, internal mini-PCI Wi-Fi supporting 802.11b (TrueMobile 1180)
③ ASUS L3501	78	189 / 1397	1m54s / 4m35s / 6m30s	AMD Mobile Athlon XP 2000+ processor, 256MB DDR SDRAM, 40GB HDD, SiS 740 graphics chipset (64MB max from main memory), 15in active TFT display	8x24x16x24x DVD-ROM/CD-R/RW combination drive, 2 USB 2.0 ports, 2 FireWire ports, Ethernet, 56Kbps modem, VGA-out, S-Video TV-out, integrated 3.5in floppy disk drive, shortcut buttons, autonomous CD player, carry bag, USB optical wheel mouse
④ Emagen N1000	77.5	194 / 1811	1m56s / 6m55s / 7m22s	1.4GHz Intel Pentium M, 256MB DDR SDRAM, 40GB HDD, Intel Extreme graphics chipset (32MB max from main memory), 14.1in active TFT display	8x16x8x24x DVD-ROM/CD-R/RW combination drive, 3 USB 2.0 ports, FireWire, Ethernet, 56Kbps modem, VGA-out
⑤ Hi-Grade Notino 4400	77	174 / 1398	4m40s / 5m / 11m30s	2.2GHz Mobile Intel Pentium 4-M processor, 256MB DDR SDRAM, 30GB HDD, SiS 650/961 graphics chipset (64MB max from main memory), 14.1in active TFT display	8x8x8x24x DVD-ROM/CD-R/RW combination slot drive, integrated 3.5in floppy disk drive, 2 USB 1.1 ports, FireWire, Ethernet, 56Kbps modem, VGA-out, S-Video TV-out, carry bag

WEIGHT (KG)		WORST CASE SCENARIO BATTERY LIFE (MINS)	GST PRICE/WARRANTY	ISSUE REVIEWED	VENDOR
without power supply	with power supply				
3.3	3.9	112	$4195￼2 years (free pickup, parts, labour and accidental damage)	Mar-03; UPGRADED Sep-03	Hi-Grade￼1800 770 550￼www.higrade.com.au
2.7	3.2	105	$5799￼1 year (2-hour turn-around when returned to base)	Aug-03	Acer￼1300 366 567￼www.acer.com.au
2.9	3.3	95	$4550￼2 years (free pickup, parts, labour and accidental damage)	NEW	Hi-Grade￼1800 770 550￼www.higrade.com.au
3.9	4.7	49	$5499￼1 year (parts and labour)	NEW	Sony Australia￼1300 138 246￼www.vaio.com.au
4.4	5.1	70	$4999￼1 year (parts and labour)	NEW	Toshiba￼13 3070￼www.isd.toshiba.com.au
3.2	3.7	72	$3999 (delivered)￼1 year (on site, next business day)	NEW	Dell￼13 3355￼www.dell.com.au
2.7	3.2	57	$2995￼2 years (free pickup, parts, labour and accidental damage)	May-03; UPGRADED Oct-03	Hi-Grade￼1800 770 550￼www.higrade.com.au
2.7	3.1	95	$2599￼1 year (on site or free pickup and return)	NEW	Mitac￼1300 880 038￼www.mitac.com.au
4.1	4.8	47	$3999￼1 year (on site or free pickup)	NEW	ITC Mobile Computing￼(08) 9486 7166￼www.itchannel.net.au
3.6	4.2	70	$2799 (delivered)￼1 year (on site, next business day)	Sep-03	Dell￼13 3355￼www.dell.com.au
3.2	3.8	58	$2299￼2 years (6 months battery)	Aug-03	AKA Technology￼(02) 9896 5688￼www.akatech.com.au
3.7	4.3	75	$2399 (delivered)￼1 year (on site, next business day)	Apr-03	Dell￼13 3355￼www.dell.com.au
3.4	4	64	$2399￼2 years (6 months on battery, return to base)	NEW	Cassa Australia￼(07) 3256 1999￼www.cassa.com.au
2.5	2.9	78	$2499￼2 years (1st year on-site with same/next day pickup, 2nd year return to base)	NEW	Emagen Computers￼1300 880 070￼www.emagen.com.au
3	3.5	75	$2495￼2 years (free pickup, parts, labour and accidental damage)	Apr-03; UPGRADED Aug-03	Hi-Grade 1800 770 550￼www.higrade.com.au

LEGEND

Benchmark Scores **Real World Tests**

SYSMark 2001 HARD DISK TRANSFER OPTICAL WRITE (CD-R)

3DMark 2001 OPTICAL READ OPTICAL WRITE (DVD-R)

WHAT THE RATINGS MEAN

VALUE RATING The Value Rating is the cumulative score achieved after the evaluation of the notebook's performance, configuration, features, price, warranty, battery life, service and support. The score is the order in which the Best Buys charts are ranked and indicates how much value you are getting for your dollar.

BENCHMARK SCORES The Benchmark scores are a combination of results from two different benchmarks:
SYSMark 2001 is an application-based benchmark that simulates everyday usage patterns. For more information, see the Web site at **pcworld.idg.com.au**.
3DMark 2001 SE (build 330) is a widely known industry standard benchmark and simulates several 3D gaming environments under the MAX-FX engine, supported by DirectX 8.1. For more information, see the Web site at **pcworld.idg.com.au**. Notebooks that achieve over 5000 in 3DMark 2001 are deemed able to play the latest graphically- intensive 3D games. To test such use with real world methods, we've employed [H]ardOCP's (**www.hardocp.com**) benchmarking utility for the popular first-person shooter game.
Unreal Tournament 2003, based on the ever-popular Unreal Warfare engine. Tests use the two most graphically taxing maps, Inferno and Face3, and the average frames per second (fps) are recorded.

REAL WORLD TESTS Rather than only presenting benchmark scores derived from scripts, a mixture of real world tests has been devised by the PC World Test Centre to simulate an average user's daily notebook usage. The new tests (outlined below) are designed to assist you in determining which notebook might be more suited for particular tasks. These tests include hard disk, CD writing, 3D game play, and CD ripping/encoding speeds.

Hard disk transfer test: A total of 699MB of data is copied from the desktop to the root directory of the hard disk.
To test the hard drive capabilities of each notebook in the Best Buys, a standard copy test is performed to see how quickly each machine can duplicate data. This type of task is commonly performed by multimedia users when copying a work in progress, and it is a good indicator of the overall read and write capabilities of the hard drive in a notebook.

Optical read test: A 699MB CD-ROM is copied to the hard disk.
This test is conducted in order to gauge the machine's performance when reading a standard CD-ROM disc. A full disc comprising various data and multimedia files is used so that each drive can perform to its optimum capabilities, reading from the innermost tracks of the CD to the outer tracks. This test will help you determine which machines have reliable optical reading capabilities, versus those with poor reading performance results. It's a sign of a potentially unreliable drive.

Optical write test: 699MB of data is written from the hard disk to a CD-ROM.
The same 699MB of data we used for the hard disk test is used to write from the hard disk to a CD-R disc at full speed with verification turned off (using bundled media and software where available). Where no software is provided, Windows XP's built-in CD writing capability is used.
   This test is conducted to review the speed at which each PC in the Best Buys can burn a full data CD. It allows the drive to perform at its optimum capabilities, as data has to be written to the inner tracks and the outer tracks. Performance will also vary depending on the software that is bundled with the drive.
   Notebooks equipped with a DVD writing drive are tested using bundled software to burn 4GB of data.
A DNF (did not finish) result refers to the inability during testing to achieve a successful DVD burn despite numerous test attempts and troubleshooting using the software supplied.

BATTERY LIFE In evaluating battery life we use a 'worse case scenario'. A test was devised that simultaneously works the CPU, all the spindle devices in the notebook, the speakers and the screen, i.e., everything that will drain the power from your notebook. In order to get a level playing field, notebooks are powered up overnight, then all power management is disabled before the test commences. The results you see are the absolute minimum lifespans of the supplied batteries. In a real world environment with power management enabled, the batteries will provide a much longer portable life, providing they are correctly used.

PRICE CATEGORIES We have reorganised the way in which the Best Buys Notebooks are presented. In line with market changes over the last few months, as well as the current Sweet Spots for budget, mid-range and power notebooks, new price criteria have been allocated to the Best Buys Notebooks. The price categories for Best Buys Notebooks are set at Sub-$2500, $2500-$4000, and Over $4000.
   The Sub-$2500 represent the top five Best Buys Notebooks, the $2500-$4000 the top five Best Buys Notebooks, and the Over $4000 the top five Best Buys Notebooks. The categories will use identifiers to clearly highlight machines recommend for multimedia desktop replacement, portable performance, value orientation or a mix of these uses. Below is a guide to the general market for these notebook categories.
Note: Pricing is provided to PC World in writing by the notebook vendors every month. The vendor is advised that it is expected to honour the price provided (except in extreme circumstances). All pricing is inclusive of GST and is effective from the first day of the magazine's cover date.
Over $4000: This sector is where the latest technology-equipped notebooks will first enter the charts and appear alongside models targeted at performance enthusiasts, professionals, and early adopters.
$2500-$4000: These mid-range notebooks range from ultra-portables to desktop replacements and are well equipped for general all-round tasks.
Sub-$2500: Aimed at the first-time buyer, student or the budget-minded user.

Processor names: Please note that Intel has changed its processor marketing terms. Desktop CPUs used in notebooks are now called Mobile Intel Pentium 4 CPUs and lack power management features. This CPU is not to be confused with the Mobile Intel Pentium 4-M CPU — the mobile version of the Pentium 4 featuring SpeedStep technology, nor the Intel Pentium M CPU — one of the 3 components forming a Centrino branded notebook.

BY ELIAS PLASTIRAS

The colour laser printer is one device that many consumers may have never even dreamed about owning due to their seemingly high price tags and large size. The reality is that the majority of these devices are now quite compact and relatively cheap to purchase for the home, and especially the office: you can easily find colour laser printers under the $2000 mark.

We looked at 12 printers from 12 different vendors this month, with prices ranging from $1549 to $5489. The lower-priced printers are perfect for home usage and small workgroups, while the higher-priced units are better suited to office environments with slightly larger workgroups and higher volume printing needs.

The purchase price alone is not the only factor to consider when buying a colour laser, as the cost of consumables and the standard features need to be looked at, too. You don't want to buy a printer whose printing costs will be expensive. You also don't want to buy a printer that does not meet your printing requirements.

The things to look for when purchasing a colour laser printer are emulation support (PCL or PostScript printer languages), memory or hard drive specifications and upgrade paths for these options, paper tray capacity and the cost of extra trays, and duplex capabilities (the ability to print on both sides of the page). Additional memory will allow a printer to process large graphics and documents with ease, in addition to being able to store downloadable fonts from the PC. Likewise, printers that have a hard drive, or an option for a hard drive, can store fonts and documents for tasks such as secure printing.

Most small office users may not even require these types of components, so it's all about weighing the cost of the printer against its features and running costs. It is worth noting that options for these printers can burn a big hole in the wallet.

How we tested

In our reviews, we looked at ease of use, support, print quality, print speed, standard options and the estimated cost per printed black and colour page to judge the best printers for the personal user and the workgroup user.

We judged print speed and print quality by using a one-page PDF file, a full-page photograph and a Microsoft Word document. The PDF file we used had a combination of graphics, tables and text, and we examined the reproduction quality of these components, specifically looking for jagged edges, lost definition and blurred text.

The photograph we used contained a dark blue background with a brightly-lit store in the foreground, and contained plenty of colour and shadow. We looked at the detail of the image and how well the printer handled the colour and colour gradations, and also checked for streaking (visible lines created by the printing process).

Our Word document was 12 pages in length and contained nothing but text along with sparsely placed colour highlights throughout the document. We looked at the crispness of the text, as well as the richness, and made sure the highlighted text was easily readable. All observations are in the 'Performance and Quality' section of the report cards.

Our test system was an Intel Pentium 4 2.8GHz computer, with 512MB of memory, a 120GB Seagate hard drive and a Gigabyte Radeon 9600 Pro graphics card.

Brother HL-2600CN

DESCRIPTION: The HL-2600CN shares the same body and engine type as the Tally printer and is a heavy unit with large dimensions and a well set-out control panel. It has network connectivity as standard along with parallel and USB 1.1 ports, and also has provision for onboard storage of print jobs via hard drive and CompactFlash memory slots. This comes in handy when using the secure printing feature of the printer, which will keep the document on these storage devices (or in main memory) and will not print the job until a PIN number is entered via the control panel. Its standard paper capacity of 250 sheets can be expanded to 750 via an extra

500-sheet paper tray, and an automatic duplexor is also an option for this unit. Its driver does allow manual duplexing. The driver program is neatly organised and all settings are clearly identified, which makes it very user friendly.

PERFORMANCE AND QUALITY: While its performance in all the tests was quite speedy, it did suffer a little in quality. Its photo reproduction was more than acceptable, yet not as sharp as the other printers in the review, and some streaking and poor gradation of colour was evident. It didn't print overly rich colours, either, and its output was a little flat compared to the others. It did excel when printing text, however, where it produced very sharp results in the Word document and PDF tests. In the PDF test, some lines did appear jaggy in the tables. In toner saver mode, the results were only slightly lighter than normal mode, and were therefore comfortably readable.

CONSUMABLES: This unit has eight consumable parts including the four-toner cartridges and requires at least

a few minutes to assemble everything. The toner cartridges easily slide into the machine from the front, while the top lid exposes the housing for the belt unit, fuser oil, cleaner and waste toner pack. These need to be installed by carefully following the instructions in the quick setup guide, because its illustrations are not as clear as they should be.

ESTIMATED COST PER PAGE: All the consumable parts have been taken into consideration when calculating the cost per page of this printer and, even with so many parts, the printer still managed some cost-efficient scores. For colour, the HL-2600CN will cost only 16.3 cents per page. Its black printed costs are 4.6 cents per sheet.

BEST USE: For the relatively busy small to medium office that requires cost-efficient colour printing of presentation and proofs. Secure printing is also supported.

Canon LBP-2410

DESCRIPTION: This printer relies on the PC's processing power and Windows operating system to process print jobs before they are ready for printing. It does not feature any of the standard laser printer languages such as PCL or PostScript, making the LBP-2410 undesirable for environments using non-Windows based operating systems such as Mac or Linux. It is compact and has a very simple control panel that contains only one button and no display screen, and in its standard form it does not ship with a paper tray. Instead, the multi-purpose tray needs to be used for input, and this holds 125 sheets of paper. An

optional tray can be purchased, which holds an extra 250 sheets. It's fairly loud, as the toner cartridges need to be rotated towards the imaging unit to apply their ink. Duplexing is not supported, either via an optional unit or by the drivers as a manual operation.

PERFORMANCE AND QUALITY: Our 12-page text document printed at approximately 4 pages per minute and the quality of the lettering was very sharp but overly dark. Photographs produced noticeable streaks but, overall, colour reproduction was very good. The PDF document was more than acceptable, only slightly pale and with jagged edges on the writing and some of the lining.

CONSUMABLES: The LBP-2410 features a drum unit that combines components such as the waste toner bottle and transfer unit, which makes it easier to maintain than printers with separate components. This drum costs $299 and its life span will depend on whether black or colour prints are being produced. The four independent toner cartridges require the lid of the unit be closed/opened and the control button to be pressed after the insertion of each cartridge, as the mechanism needs to rotate and expose each colour housing.

ESTIMATED COST PER PAGE: The drum unit will print approximately 20,000 A4 sheets in black, or 5000 sheets in colour. Combined with the black toner which costs $159, and the colour toners which cost $189, you can expect print costs to be close to 4.7 cents for black pages and 23.3 cents for colour pages.

BEST USE: For the home user who wants something more cost-effective than an inkjet when it comes to printing colour documents.

Epson Aculaser C4000
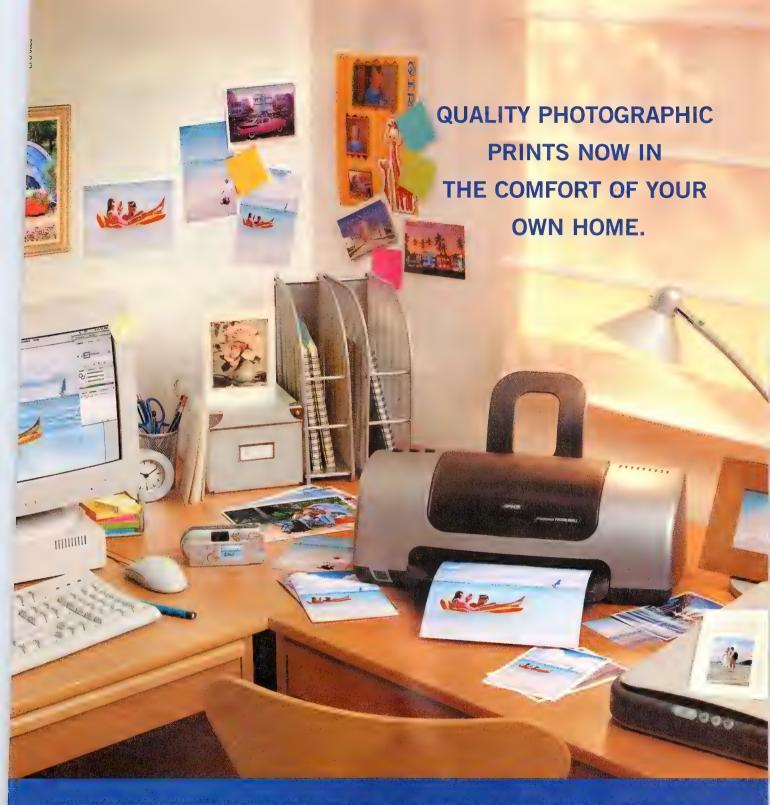
DESCRIPTION: The Aculaser C4000 is the most expensive printer in this round-up, and also the most powerful. It features a 400MHz processor in conjunction with 192MB of memory fitted as standard, and it prints pages very quickly. It supports PCL5e and Epson GL/2 printing languages and offers excellent standard connectivity and paper handling. It can accommodate

up to 600 sheets via its main and multi-purpose trays, and with the addition of two optional 500-sheet trays it will hold up to 1600 sheets at one time. Its control panel is very easy to navigate and its printer driver is among the most flexible in terms of adjusting print quality. It is a bulky unit, though, and the quality of its body work is a little suspect, considering how easily the toner cartridge cover can be removed. Likewise, the paper tray protrudes right through to the back of the unit and has a very flimsy cover. The printer comes standard with a duplexor, and Epson supports the machine with a one-year on-site warranty.

PERFORMANCE AND QUALITY: The Epson marketing spiel is correct when it comes to pages per minute, for this machine indeed did print our 16-page (sparsely coloured) Word document in exactly one minute. Its colour photo and PDF output were not as fast as the Fuji Xerox Phaser 8200, but nonetheless very quick. The Epson's text quality is not as sharp as other laser printers and slight blurriness and bleeding are evident. It does produce very rich text, however, and when printing purely in black a setting called RI Tech, if enabled, will produce smoother lettering. In toner saving mode the prints were noticeably light, yet very readable. Photo output showed slight streaking on the page, but overall detail was good. Its colours were a little too biased towards yellow. The clarity and detail of PDF file reproduction were excellent, but text was not as black as it should have been.

CONSUMABLES: There are four easily replaceable toner cartridges, and other

components that will need replacing include the drum and fuser units. Two optional 500-sheet paper trays can be purchased for an additional $2079.

ESTIMATED COST PER PAGE: The drum unit and the toner cartridges combine to offer black printed pages for around 3.9 cents per page and colour printed pages for around 19.8 cents.

BEST USE: For users who require high speed and plenty of printing capacity.

Fuji Xerox Phaser 8200DP

DESCRIPTION: The Phaser 8200DP is one of the heavier machines in the review, which is odd as the solid ink ColorStix that it utilises are minuscule compared to the toner cartridges of other machines. It is also one of the loudest, probably due to its insanely zippy print engine which spits out pages like they're hot potatoes! It has a standard input paper tray of 200 sheets, and with two extra 500-sheet paper trays can handle up to 1200 sheets. Its control panel has a large LCD display and is easy to navigate, but the control buttons are slightly sticky in operation. This printer features automatic duplexing as standard. Xerox supports the printer with a one-year on-site warranty, but extended periods and services are available at extra cost.

PERFORMANCE AND QUALITY: While in sleep mode, the printer takes a good few minutes to wake up after a print command has been initiated from the PC, but once its temperatures are up, it gets pumping to the tune of around 10 pages

per minute in colour mode. Its quality is very good in text output, with only slight bleeding evident in the lettering. Photo reproduction is very quick and very rich and vibrant, free of streaking but slightly purple in reproducing blues. Its PDF output was also very rich with very sharp text reproduction, but detail was lost in the masthead of our test print, where thin dark red lines were drowned out in a brighter red background.

CONSUMABLES: The non-toxic, solid ink ColorStix that this Phaser uses have reportedly been developed over a 15-year period, and resemble crayons. They are very easily installed: simply lift the output tray of the printer to expose the ink stick housing, match the sticks to their respective colour columns and slide them into place. The sticks are very visible and you can check to see how much ink is left and replenish it as needed, without waiting for the printer to tell you. The other advantage is that these sticks can be stacked (up to three or four per column).

ESTIMATED COST PER PAGE: The only consumable outlay is the cost of the four ink ColorStix and the maintenance kit ($460), the latter consisting of a roller and a counter, which lasts up to 40,000 prints. There is no drum unit, belt unit, fusers, oil, or waste bottles to tinker with. Ink ColorStix are sold in packs of five or 10 for black, and two or five for each colour. A box of 10 black ink ColorStix will last approximately 14,000 pages and costs $396, while a box of five colour ink ColorStix costs $405 for each colour and lasts up to 7000 pages. This equates to a cost per page of approximately 3.9 cents when printing in black only and 21.1 cents when printing in colour.

BEST USE: For users who require good quality and very fast printing of presentations and leaflets, as well as minimal and very easy maintenance.

HP LaserJet 1500

DESCRIPTION: The LaserJet 1500 is based on the same print engine as the Canon LBP-2410 and shares the same footprint dimensions. Unlike the Canon, however, HP ships this printer with a 250-sheet paper tray for its $1699 asking price, and an extra 500-sheet tray can be purchased. The printer has

a fixed memory capacity and relies on the operating system (Windows or Mac) to process print jobs. The unit ships with USB 2.0 connectivity as standard, but HP has print server options available, too. While the printer can not accommodate a duplex unit, the driver does allow manual duplexing. Paper can be saved but ink can not, as the driver does not have a toner saver function.

PERFORMANCE AND QUALITY: In the photo quality tests the printer provided good results, although some colour gradation problems were evident, as was some splotchiness. Its colours were rich, although reds came out slightly orange, and also more vibrant than the Canon printer. Its print times were slightly slower than the Canon. Text output was very crisp and its PDF reproduction boasted good sharpness and detail.

CONSUMABLES: The LaserJet 1500 features a drum unit that combines components such as the waste toner bottle and transfer unit, which makes it easier to maintain than printers with separate components. At $403, this drum costs markedly more than the Canon equivalent, as do the toners, but it will produce 1000 more colour copies than the Canon drum. The four independent toner cartridges require the lid of the unit be closed/opened and the control button to be pressed after the insertion of each cartridge, as the mechanism needs to rotate and expose each colour housing.

ESTIMATED COST PER PAGE: Costing 5.8 cents to print a black page and 27.5 cents to print a colour page, this unit is expensive to run compared to the other machines in the review.

BEST USE: Its cost per page may be slightly high, but the LaserJet 1500 is nevertheless an attractive proposition for the home user who has high colour printing needs that can't be satisfied with an inkjet printer.

**The Lanier LP020c.
The smallest colour laser printer in the world.**

If you'd prefer that your documents made a big impression rather than your printer, choose the Lanier LP020c.

No bigger than a conventional black and white printer, it produces sixteen A4 colour pages per minute (twenty in black and white), and comes with an easily-installed internal duplex option for double-sided printing at optimum speed.

So whether you're a PC or Macintosh user, if your workgroup or department would like to add colour to reports, mailers - even entire presentations - without sacrificing space, quality or productivity, the Lanier LP020c is ideal. Best of all, it's also very small on price.

Think Lanier, your document management partner.

For more information call 1300 362 345 or visit www.lanier.com.au

LANIER

Kyocera-MITA FS-C5016N Ecosys

pc world BEST BUYS **DESCRIPTION:** The Kyocera Ecosys FS-C5016N is not precisely a laser printer: it creates prints with an LED imaging system that has been refined to produce outstanding quality. It's a smaller (and lighter) unit than is usual for such high-volume printing. This is one of the most environmentally friendly printers on the market, a fact that should not be overlooked when considering a high-volume printing machine. Kyocera has built this printer using resin from recycled plastic and has omitted chrome and lead in the metal plating and wiring construction. In addition, the printer's box packaging contains only biodegradable material, and most importantly, its drum unit has a touted life span of 200,000 pages! It features Ethernet as well as Parallel and USB 2.0 connectivity, and is perfect for the office environment due to its relatively silent operation, high duty cycle and low running costs. It has options for a duplex unit. It can accommodate a hard drive and a CompactFlash card for better document management and the storage of extra fonts and macros. It claims the highest paper capacity of all the printers in this review, a maximum of 2100 sheets via an extra paper feeder.

PERFORMANCE AND QUALITY: In the photo tests, the FS-C5016N Ecosys produced excellent results, with rich and vibrant colour output (although its blue was slightly purple), and images were free of streaks. Detail was also excellent, with no evident colour gradation problems. Text was very rich and crystal clear and it produced the best PDF output in the review, with excellent sharpness in both images and text, along with rich colouring and no loss of detail. Ecosys mode allows the amount of toner used on a page to be reduced up to 50 per cent.

CONSUMABLES: The maintenance kit for this printer includes a drum unit along with all associated components such as the fuser and transfer unit. Each toner cartridge is easily replaceable through the top of the unit.

ESTIMATED COST PER PAGE: This printer is the most cost-effective in the round-up, by far, with black page print costs less than 2 cents and colour page print costs less than 8 cents.

BEST USE: This printer is definitely a best buy for a workgroup environment needing high volume and very good quality colour printing, along with a very low total cost of ownership.

Lanier LP020c

DESCRIPTION: This printer has an easy-to-use control panel with a two-line LCD screen and is based on the same print engine as the Panasonic and Ricoh printers in the review. It has a large standard paper capacity of 630 sheets, but two extra trays can push its capacity up to 1690 sheets. Support for the major printer emulation languages is present. Onboard memory can be boosted and a hard disk can be added. Lanier offers the LP020c as a personal printer, as it does not come standard with either duplexor or Ethernet connectivity, but these can be purchased as options. The printer's driver allows manual duplexing, and also contains simple functionality for creating and saving print profiles. In fact, the driver for this printer is very user-friendly and makes the unit a joy to use.

PERFORMANCE AND QUALITY: In our photo quality tests the LP020c produced very good quality, with accurate and rich colour output and only slightly visible streaks. Its text output in our Word document was crisp and rich, but our PDF document showed up slightly blurred and jagged. Toner saving mode produced excellent output that was only slightly lighter than normal mode printing, and is perfect for page proofs.

CONSUMABLES: Installation requires two separate drum units, one for black and one for colour, in addition to the four separate toner cartridges and waste bottle. Interestingly, the yellow cartridge is longer than the other cartridges but is said to have the same yield.

ESTIMATED COST PER PAGE: When all consumables are taken into account, this printer has very competitive operating costs, with black pages costing under 3 cents and colour pages under 15 cents. Lanier offers service contracts based on print volume, too, whereby clients can choose to enter into a Per Print Cost Agreement. This means customers are charged 1.8 cents per black print and 12 cents per colour print, and these additional costs go towards covering all on-site service needs (parts and labour) except for replacement toner consumables. Otherwise, clients can pay $800 per year for the same support plan.

BEST USE: As a personal printer for the home user or even in a small workgroup environment for office users, this printer will provide good quality, cost-effective text and colour output.

Minolta-QMS Magicolour 2300DL

pc world BEST BUYS **DESCRIPTION:** The Magicolour 2300DL has small dimensions and is a brisk, well featured, sub-$2000 printer. It ships with Ethernet connectivity as standard, in addition to Parallel and USB 1.1, and it is purely a Windows-based printer. It uses the PC to process print jobs through the operating system, but high-detail print jobs can also benefit from the 32MB of onboard memory, which is expandable to 288MB.

The printer does not have a paper tray, per se, just an opening on its side where a stack of up to 250 A4 sheets can be placed. The location of this input could be inconvenient. An extra paper tray can be added to increase the paper handling capacity to 750 sheets. Manual duplexing is supported by the driver program, but if flipping pages is not your thing, then an automatic duplexor is available as an option.

PERFORMANCE AND QUALITY: Text quality was sharp and dark in our Word and PDF documents, and the latter document also benefited from good detail in the tables and images. Colour photo reproduction was a little disappointing, with poor colour gradation evident in areas of similar colour. Streaking was present, but printing did provide good brightness and relatively good sharpness.

CONSUMABLES: The printer ships with standard yield colour cartridges, which are good for about 1500 prints, and high-capacity toners are available that will last up to 4500 pages. The only other consumables in this unit are the drum unit and the waste toner kit, and the drum cartridge is very inexpensive when compared to some of the other printers in this review. Installation is through the front of the printer and is relatively painless.

ESTIMATED COST PER PAGE: Compared to the other sub-$2000 printers in this round-up, the 2300DL comes up trumps in total cost of ownership. Black prints will cost just over 3 cents per page. Colour prints will cost just under 18 cents per page.

BEST USE: With small dimensions and simple setup as two of its strong points,

the 2300DL is excellent for the home or small office user who wants a no-fuss laser capable of good quality colour output.

OKI C5300

DESCRIPTION: Like the Kyocera, OKI's C5300 is not precisely a laser printer in that it uses light emitting diodes (LEDs) to create images on the page. It prints in a single pass due to the implementation of four separate drum units for each colour. The OKI achieved similar speeds to the Kyocera in all tests. It was a little hard to install, the PCL printer drivers being problematic on my patched Windows XP-based system. OKI's Web site confirms that these drivers have problems when installed on an XP system with up-to-date patches, but even with only Service Pack 1 installed, the PCL drivers would not work. We tested the printer with the PostScript drivers without any problems, though. Connectivity is available through Ethernet, USB 1.1 and Parallel ports, and paper handling can be increased to a maximum of 830 sheets via an extra 530-sheet paper tray. A duplex unit can be purchased for double-sided printing.

PERFORMANCE AND QUALITY: The C5300 presented us with a problem that was not evident on any of the other machines in the review during our photo tests: the pages curled considerably at the edges. This might be due to the amount of ink the printer uses to fill the page, as the photos were extremely rich, making them look warm and vibrant. Some streakiness was evident in the photos but, overall, detail and colour quality were very good. Text output from our Word document was brilliant and our PDF document also showcased excellent text, although lines in the tables appeared jagged.

CONSUMABLES: Cartridge installation is a little awkward on this machine because the toner needs to be angled into position and plenty of loose toner dust is exposed when they are replaced.

ESTIMATED COST PER PAGE: The use of separate drum units for each colour puts this printer roughly in the middle of the pack in terms of total cost of ownership. Black pages will cost 4.5 cents to print and colour pages 20.7 cents.

BEST USE: A relatively small footprint

makes this unit suitable for home office situations, but its advanced feature set and available options also make it perfect for small to medium workgroup environments.

Panasonic KX-CL500N

DESCRIPTION: Using the same print engine as the Lanier and Ricoh machines, Panasonic's KX-CL500N is based on a slightly slower processing unit, but its print speeds were still very competitive. It has an option for a duplex unit, but manual duplexing is supported by the driver, too. This task is slightly complex, though, as each sheet needs to be flipped correctly and placed in the paper tray individually, rather than as a stack. Its driver is also a little tedious to use because common settings for adjusting paper and quality are hidden in an Advanced menu option. The KX-CL500N's range of connectivity makes it prepared to tackle office as well as home environments. Its standard paper capacity is the equal largest in the review and is expandable to 1690 sheets.

Print speeds so incredible, even the colours hold fast.

With the innovative in-line technology of the HP Color LaserJet 4600 and HP Color LaserJet 5500, you can print faster than conventional printers. That's up to 22 pages* per minute in colour, or black and white. Now, what's holding you up?

hp.com/hpincolour

COLOUR LASER PRINTERS	BROTHER HL-2600CN	CANON LBP-2410	EPSON ACULASER C4000	FUJI XEROX PHASER 8200DP	HP LASERJET 1500	KYOCERA-MITA FS-C5016N ECOSYS
Price	$3799	$1549	$5489	$4295	$1699	$4949
Warranty	1 year on-site	1 year RTB	1 year on-site	1 year on-site	1 year next day on-site	1 year RTB
Phone	(02) 9887 4344	1800 021 167	1300 361 054	1300 793 769	13 2347	1300 364 429
URL	www.brother.com.au	www.canon.com.au	www.epson.com.au	www.xeroxprinters.com.au	www.hp.com.au	www.kyoceramita.com.au

SPECIFICATIONS

	BROTHER HL-2600CN	CANON LBP-2410	EPSON ACULASER C4000	FUJI XEROX PHASER 8200DP	HP LASERJET 1500	KYOCERA-MITA FS-C5016N ECOSYS
Dimensions (WxDxH) in mm	500x520x410	482x451x325	439x638x445	432x600x390	482x451x376	345x470x385
Weight in kg	39	27	not stated	36	24	21
Duty cycle	not stated	not stated	35,000 pages per month	65,000 pages per month	not stated	85,000 pages per month
CPU	266MHz	not stated	400MHz	300MHz	150MHz	400MHz
Standard memory	64MB	8MB	192MB	128MB	16MB	96MB
Maximum memory	384MB	8MB	1024MB	256MB	16MB	608MB
Hard drive	not installed	not applicable	not installed	not installed	not applicable	not installed
Maximum power consumption	600W	1102W	850W	not stated	403W	not stated
Standard interfaces	Parallel, USB 1.1, 10/100 Ethernet	USB 2.0	Parallel, USB 2.0, 10/100 Ethernet	Parallel, USB 2.0, 10/100 Ethernet	USB 2.0	Parallel, USB 2.0, 10/100 Ethernet
Standard input paper tray capacity	250 sheets	125 sheets	500 sheets + 100-sheet multi-purpose tray	200 sheets	365 sheets via two input trays	500 sheets + 100-sheet multi-purpose ray
Standard output paper tray capacity	250 sheets	125 sheets	250 sheets	not stated	125 sheets	250 sheets
Maximum input paper handling	750 sheets via extra paper tray	375 sheets via extra paper tray	1600 sheets via extra paper trays	1200 sheets via extra paper trays	865 sheets via extra paper tray	2100 sheets via extra paper trays
Maximum print resolution	2400dpi	600dpi	1200dpi	1200dpi	2400dpi (optimised)	600dpi
Supported printer languages (drivers)	PCL 5 & 6, BR-script3 (PostScript 3 emulation), IBM Proprinter XL, Epson FX-850, HPGL	Operating system based (Windows)	PCL5e, Epson GL/2	PCL5c, PostScript 3	Operating system based (Windows and Mac)	PCL5c, KPDL3 (PostScript 3 compatible), PDF Direct Print
Duplex support	Yes – via optional unit, but manual operation supported	No	Yes – automatic via standard duplex unit	Yes – automatic via standard duplex unit	Yes – manual operation only	Yes – via optional unit

CONSUMABLES AND COST PER PAGE

	BROTHER HL-2600CN	CANON LBP-2410	EPSON ACULASER C4000	FUJI XEROX PHASER 8200DP	HP LASERJET 1500	KYOCERA-MITA FS-C5016N ECOSYS
Separate imaging drum or belt unit	Yes – belt	Yes – drum	Yes – drum (with waste bottle included)	No	Yes – drum	Yes – drum (included in maintenance kit)
Drum or belt unit cost	$620	$299	$874	not applicable	$403	$1163
Drum or belt unit yield	60,000 pages	20,000 black pages / 5000 colour pages	30,000 pages	not applicable	20,000 black pages / 6000 colour pages	200,000 pages
Black toner/ink cost	$299	$159	$88	$396 (10 pack)	$193	$109
Black toner/ink yield	12,000 A4 pages @ 5% coverage	5000 A4 pages @ 5% coverage	8500 A4 pages @ 5% coverage	14,000 A4 pages @ 5% coverage	5000 A4 pages @ 5% coverage	8000 A4 pages @ 5% coverage
Cost per colour toner/ink cartridge	$279	$189	$319	$405 (5 pack)	$232	$164
Colour toner/ink yield	7200 A4 pages @ 5% coverage	4000 A4 pages @ 5% coverage	6000 A4 pages @ 5% coverage	7000 A4 pages at 5% coverage	4000 A4 pages @ 5% coverage	8000 A4 pages @ 5% coverage
Fuser oil/yield	$64/12,000	not applicable	not applicable	not applicable	not applicable	incl. in maintenance kit
Fuser cleaner/yield	$93/12,000	not applicable	not applicable	not applicable	not applicable	incl. in maintenance kit
Waste toner pack/yield	$41/18,000 images	not applicable	included with drum	not applicable	not applicable	incl. with toner
Other	none	none	none	Maintenance kit ($459 for 40000 pages)	none	none
Approx. cost per black printed page[1]	4.6 cents	4.7 cents	3.9 cents	3.9 cents	5.8 cents	1.9 cents
Approx. cost per colour printed page[2]	16.3 cents	23.3 cents	19.8 cents	21.1 cents	27.5 cents	7.9 cents

OPTIONS

	BROTHER HL-2600CN	CANON LBP-2410	EPSON ACULASER C4000	FUJI XEROX PHASER 8200DP	HP LASERJET 1500	KYOCERA-MITA FS-C5016N ECOSYS
Hard drive	Yes – $1077	not applicable	Yes – $1309	Yes – $1089	not applicable	not stated
Memory	not stated	not applicable	Yes – $248 (128MB)	Yes – $198 (64MB), $385 (128MB)	not applicable	not stated
Extra paper tray	$999	399	$2079	$1089	726	$5570
Duplex unit	$2199	none	standard	standard	none	$658
Other	none	Network adapter – $399	PostScript 3 kit	none	Jetdirect print server	none

PERFORMANCE

	BROTHER HL-2600CN	CANON LBP-2410	EPSON ACULASER C4000	FUJI XEROX PHASER 8200DP	HP LASERJET 1500	KYOCERA-MITA FS-C5016N ECOSYS
12-page Word document[3]	2m 26s	3m 16s	1m	1m 16s	3m 37s	1m 09s
1-page colour PDF[4]	40s	29s	21s	13s	32s	25s
Full-page colour photograph[5]	1m 18s	31s	1m 31s	56s	40s	40s
12-page Word document duplex[3]	manual – not timed	not applicable	1m 36s	1m 28s	manual – not timed	not applicable

Key: [1] derived by dividing the cost of the toner (ink) and all associated consumables by the manufacturer's stated page yield; [2] derived by adding the cost of the separate toner (ink) cartridges and all associated consumables and dividing by the

LANIER LP020C	MINOLTA-QMS 2300DL	OKI C5300	PANASONIC KX-CL500N	RICOH AFICIO CL3000DN	TALLY T8006E
$4510	$1779	$3575	$4499	$5200	$2996
2 years (refer to report card for available options)	1 year on-site	1 year RTB	1 year on-site (metro and capital cities)	2 years on-site	1 year on-site (depending on location)
1300 362 345	(02) 9884 9966	1800 800 140	1300 723 279	1300 363 741	1300 138 839
www.lanier.com.au	www.minolta-qms.com.au	www.oki.com.au	www.panasonic.com.au	www.ricoh.com.au	www.tally.com.au
419x536x395	356x500x392	422x528x345	419x536x396	419x536x395	500x520x410
32	28	26	30	32	39
50,000 pages per month	35,000 pages per month	50,000 pages per month	50,000 pages per month	50,000 pages per month	30,000 pages
400MHz	200MHz	400MHz	360MHz	400MHz	33MHz
64MB	32MB	64MB	64MB	64MB	64MB
384MB	288MB	320MB	192MB	384MB	192MB
not installed	not installed	not installed	not installed	not installed	not installed
1300W	1100W	not stated	1200W	1300W	not stated
Parallel, USB 2.0	Parallel, USB 1.1, 10/100 Ethernet	Parallel, USB 1.1, 10/100 Ethernet	Parallel, USB 1.1, 10/100 Ethernet	Parallel, 10/100 Ethernet, USB 2.0	Parallel, 10/100 Ethernet
530 sheets + 100-sheet bypass tray	250 sheets	300 sheets	530 sheets + 100-sheet bypass tray	530 sheets + 100-sheet bypass tray	250 sheets
250 sheets	200 sheets	250 sheets	250 sheets	250 sheets	250 sheets
1690 sheets via 2 extra 530-sheet trays	750 sheets via extra paper tray	830 sheets via extra paper tray	1690 sheets via 2 extra 530-sheet trays	1690 sheets via 2 extra 530-sheet trays	750 sheets via extra paper tray
1200dpi	2400dpi	1200dpi	1200dpi	1200dpi	1200dpi
PCL5c, RPCS, PostScript 3	Operating system based (Windows)	PCL 5c, PostScript 3	PCL 5c (PostScript 3 optional)	PCL5c, RPCS, PostScript 3	CPL (Tally compressed printer language for Windows and Mac)
Yes – via optional unit, but manual operation supported	Yes – via optional unit, but manual operation supported	Yes – via optional unit	Yes – via optional unit, but manual operation supported	Yes – automatic via standard duplex unit	Yes – via optional unit
Yes – drum for black and colour	Yes – drum	Yes – one per colour	Yes – drum for black and colour	Yes – drum for black and colour	Yes – belt
$159 (black), $586 (colour)	$212	$258 per colour	$244 (black), $834 (colour)	not stated	$239
13,000 pages (black), 13,000 pages (colour)	45,000 A4 pages @ 5% coverage	22,000 A4 pages @ 5% coverage	13,000 pages (black), 13,000 pages (colour)	13,000 pages (black), 13,000 pages (colour)	60,000 pages
$49	$144	$93	$73	not stated	$297
5000 A4 pages @ 5% coverage	4500 A4 pages @ 5% coverage	5000 A4 pages @ 5% coverage	5000 A4 pages @ 5% coverage	5000 A4 pages @ 5% coverage	12,000 A4 pages @ 5% coverage
$118	$216	$218	$171	not stated	$420
5000 A4 pages @ 5% coverage	4500 A4 pages @ 5% coverage	5000 A4 pages @ 5% coverage	5000 A4 pages @ 5% coverage	5000 A4 pages @ 5% coverage	7200 A4 pages @ 5% coverage
not applicable	not applicable	not applicable	not applicable	not applicable	$37/12,000
not applicable	not applicable	not applicable	not applicable	not applicable	$38/12,000
$23/24,000 black/6000 colour pages	$87/not stated	not applicable	$36/24,000 black/6000 colour pages	24,000 black/6000 colour pages	$14/12,000
Transfer unit ($200/83,000 pages), fuser unit ($469/100,000 pages)	none	Transfer unit ($452/50,000 pages), fuser unit ($342/45,000 pages)	Accumulator unit ($349/83,000 pages), transfer roll ($52/100,000), fuser unit ($534/100,000 pages)	Transfer unit (83,000 pages), fuser unit (100,000 pages)	Fuser unit ($544/60,000)
2.8 cents	3.2 cents	4.5 cents	4.4 cents	unable to calculate	4.3 cents
14.6 cents	17.6 cents	20.7 cents	21.4 cents	unable to calculate	21.7 cents
Yes – price not stated	Yes – $1271	Yes – $979	Yes – $1199	Yes – $770	Yes – $832
Yes – price not stated	Yes – $103 (64MB)	Yes – $721 (128MB)	not stated	Yes – $220 (128MB)	Yes – $293
Yes – price not stated	$971	Yes – $826	Yes – $899	Yes – $880	Yes – $381 (500 sheets)
$514	$984	$721	$799	standard	$2,304
Ethernet ($621), FireWire, Bluetooth and 802.11b	none	none	PostScript 3 kit	802.11b, Bluetooth, FireWire	none
1m 42s	2m 48s	1m 27s	1m 45s	1m 40s	1m 36s
23s	29s	22s	27s	23s	28s
1m 20s	44s	52s	55s	25s	1m 34s
2m 07s via optional unit	not timed	not applicable	not timed	2m 06s	not applicable

manufacturer's stated page yield; [3] based on plain text with sparse colour highlighting and default quality settings; [4] based on default quality settings; [5] based on highest quality and photograph settings on plain laser paper

PERFORMANCE AND QUALITY: Output was not dark enough in any of the imaging tests. Streaks were evident in the photo output test and colour was noticeably pale. The PDF output test showed similar signs of paleness and jagged lines in the tables, though its text quality was very good. Our Word document had crisp, clear lettering that was very easy on the eye.

CONSUMABLES: Installation requires that two separate drum units be placed in the system, one for black and one for colour, in addition to the four separate toner cartridges and waste bottle. Interestingly, the yellow cartridge is longer than the other cartridges but is claimed to have the same yield.

ESTIMATED COST PER PAGE: The consumable costs for the Panasonic are significantly higher than for the similar Lanier machine, and this makes the KX-CL500N a lot more expensive to run. Black printed pages will cost 4.4 cents per page, while colour pages will cost 21.4 cents per page.

BEST USE: This printer is well equipped to handle the workload of a small office environment that needs to print proofs of colour documents.

Ricoh Aficio CL300DN

DESCRIPTION: The CL3000DN is designed with small workgroups in mind and ships with a duplex unit, as well as USB 2.0 and Ethernet connectivity as standard. It has a standard paper handling capacity of 630 sheets, which, along with the Lanier and Panasonic machines that share the same print engine, is the largest standard capacity in this round-up. This can be expanded to 1690 sheets by adding two extra trays. It also supports all the major printer emulation languages as standard. There are options for a 10GB hard drive (for tasks such as secure printing and storing fonts) and extra memory up to 384MB, which aids complex and high-detail print jobs.

PERFORMANCE AND QUALITY: In the photo quality tests, the CL300DN produced slightly darker tones than the Lanier printer, and its quality was just as good, with only slight streaking evident in the picture. The PDF test showcased this printer's ability to produce excellent, sharp and clear text, and the clarity and colour of this document's output was among the best in the round-up. Text quality in our Word document was brilliant in all regards.

CONSUMABLES: Installation requires that two separate drum units be placed in the system, one for black and one for colour, in addition to the four separate toner cartridges and waste bottle. Interestingly, the yellow cartridge is longer than the other cartridges but is claimed to have the same yield.

ESTIMATED COST PER PAGE: Unfortunately, Ricoh could not give us pricing on its consumables as they are sold through their resellers under print management programs on click charge rates for black and colour prints (similar to the Lanier printer). This puts the user into a contract that also includes financing, servicing and maintenance. Contact Ricoh for the full details.

BEST USE: The standard feature set on this printer makes it perfect for the small workgroup office environment.

Tally T8006e

DESCRIPTION: If you're thinking about buying a colour laser for the office, but aren't sure you can afford the expense, check out Tally's Factory Sponsored Program — you don't have to buy the printer, just pay for the Tally consumables. Tally will provide full support for the printer as well as maintenance, and when the T8006e's life span has ended, it will replace the printer with a newer model. The printer itself is based on the same print engine as the Brother in this review, but utilises the PC's processing power to churn through print jobs. It uses Tally's own CPL compressed printer language, which shrinks print jobs on their way to the printer. It has Parallel and 10/100 Ethernet connectivity as standard, and options include a duplexor, more memory, a hard drive and a 500-sheet paper tray.

PERFORMANCE AND QUALITY: Although the Tally is based on the same engine as the Brother printer, its driver program churned out pages at a much faster rate in the Word document and PDF file tests. It took slightly longer to produce a colour photograph, and its quality in this test suffered, the printed photo having a very yellow emphasis. Streaking was barely noticeable, but detail and colour gradations did suffer a little. Detail was lacking in our PDF test: the red masthead did not show up properly and the lines making up the table were jaggy. Text, however, was crisp and clear, and this was reflected in the Word document test, too.

CONSUMABLES: This unit has eight consumable parts, including the four toner cartridges, and requires at least a few minutes to put everything into position. The toner cartridges easily slide into the machine from the front, while the top lid exposes the housing for the belt unit, fuser oil, cleaner and waste toner pack. These are also fairly simple to install, but if you get confused you can refer to the excellent instruction videos on the driver CD-ROM.

ESTIMATED COST PER PAGE: With a large amount of consumables needed to run this printer, along with high-yield toner cartridges, the costs add up to produce a black page at 4.3 cents and a colour page at 21.7 cents.

BEST USE: The purchase plans offered with this printer make it perfect for the office that has colour printing needs. ■

BEST OF BOTH WORLDS

Something old, something new

This month's Here's How section has something for everyone — whether you're in the market for some hot new gear or just keen to optimise the technology you already own.

In Depth, for instance, focuses on improving your use of that old e-mail standby Outlook. This is something many people probably use every day without really considering the subtle improvements and tweaks that can make it work a whole lot more in line with your style. With e-mail volumes going through the roof and spam an increasing problem, getting your messaging in hand is more important than ever.

On the new side of the equation our Windows columns have some new stuff for both Home and Pro users. **Windows XP Home** this month introduces Microsoft's Plus! Digital Media Edition, an add-on designed to help you with multimedia tasks such as digitising your record collection and creating slide shows. Like other Plus! products, this one has a frivolous side, but may appeal to multimedia mavens. In **Windows XP Pro**, meanwhile, we highlight how you can use a recent Windows Update file to enable next-generation networking with IPv6.

There's also something new for Linux and Mac users in this month's issue. In **Linux** we detail how you can get started with the full-version Linux distribution on this month's cover CD, Knoppix 3.2. If you've been watching Linux for a while, but were unsure of which move to make, Knoppix could be worth a try. Knoppix can run entirely from a CD, so you can use it on any PC immediately without having to perform an installation. Similarly, when you want to remove Knoppix it's as easy as taking out the CD and rebooting your PC. This is also a great option for Linux users who regularly need to use a Windows PC.

For **Mac** users, we look at the new, good-looking iSight camera and how you can use it with iChat software — but there are also some alternatives if you can't rush out and buy the new hardware just yet.

Whatever your OS allegiance, all this multimedia work may require a new sound card. This month's **Audio** has some advice for choosing a new card as well as installation tips to make the upgrade go smoothly.

Keen on digital photography and an XP user? This month's **Graphics** column is a must-read for you. With Windows XP and the right camera, you should be able to transfer your photos quickly and easily to your PC. The column will walk you through the process, detailing how you can use XP's Camera Wizard.

Prefer moving pictures to still? The **Digital Video** column looks at some of the new features of Adobe's Premiere Pro. If you're familiar with Premiere, a mainstay of the enthusiast and semi-professional video editing crowd, these changes make for interesting reading. For instance, new professional effects, stronger audio and colour tools as well as more control over the workspace could help you take your videos up a notch. ■

Improve your Outlook

E veryone these days e-mails on overdrive and the application of choice for many for this task is Microsoft's Outlook. Outlook XP offers a host of improvements over earlier versions of the software, including enhanced scheduling and contact management tools, all wrapped up in a polished interface.

Outlook's strength comes from its ability to cross-reference information from its e-mail messages, contacts list and diary information, giving users the kind of flexibility and power available in specialist sales contact management software.

Here we take a look at some of the facilities offered by Outlook XP, aka Outlook 2002, which is available singly or as part of the Office XP suite.

Hoarders and obliterators

There are two extreme types of e-mail users — hoarders and obliterators. Hoarders hate to delete e-mails and usually have thousands of messages in their inboxes which are rarely (if ever) read more than once. Obliterators are the opposite: they refuse to leave a read e-mail in their inboxes. As soon as a message arrives, it is read and promptly deleted.

How many e-mails are there in your inbox? If you have fewer than 10 you're an obliterator; more than 1000 and you're a hoarder.
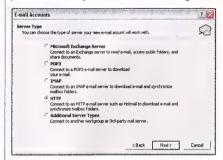
Although there is no right or wrong when it comes to e-mail management, both of these extremes in cyber behaviour will cause problems that could be avoided by using some of the e-mail management tools built into Outlook.

Hoarders will find that the sheer number of e-mails in their inboxes will slow down Outlook. The application will take longer to start up and the time taken to open a new message or reply to a received message will increase significantly.
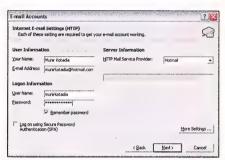
The worst thing for an obliterator is to receive an e-mail that they don't want to delete immediately. They often kick

COLLECTING WEB MAIL VIA OUTLOOK

You don't have to use a browser to check your Hotmail (or any other Web-based e-mail) account. It's a straightforward process to access your Hotmail account using Outlook.

1. Choose *Tools-E-mail Accounts* then in the box pick 'Add a new E-mail Account'. Select the fourth option labelled HTTP.

2. Insert the details of your account. A new shortcut will appear in your Outlook Bar displaying e-mails downloaded from your Web mail account.

themselves because they have deleted a message that contained important information which is now lost.

The best solution is to reach a happy compromise by keeping your inbox light, without permanently deleting everything to achieve that goal. To avoid your system slowing down without becoming an obliterator, use Outlook's auto-archiving and e-mail filtering facilities.

Auto-archive removes old messages from your inbox and stores them elsewhere in a compressed state. This leaves Outlook free of clutter but also enables you to access old messages when necessary.

To change archive settings on your inbox, right-click on the inbox icon in the Outlook Shortcuts Bar on the left of the screen (activate with *View-Outlook Bar*). Click on *Properties* and choose the *AutoArchive* tag. This will allow you to decide how long to keep messages in the inbox before moving them to the archive folder.

To access archived messages, click *View* and choose *Folder List*. Double-click *Archive Folders* and pick *Inbox*. Now find the message you want. To return to your current Inbox, click on the *Inbox* icon on your Outlook Bar.

Dealing with spam

The best way to deal with spam is to activate and continually update Outlook's

Junk and Adult content filters. These filters inspect e-mails as they arrive and can divert known junk messages away from your main inbox.

The unwanted messages can be deleted or, depending on your hoarding instincts, archived in a Junk E-mail folder. To activate e-mail filtering go to the *Tools* menu and choose *Organise-Junk e-mail* and click *On*.

The simple way to add an e-mail to your Junk list is to right-click on the offending message, then pick either 'Add to Junk senders list' or 'Add to Adult Content senders list'. From that point, any more e-mail from that sender will not reach your inbox.

Although this system works quite well and results in the vast majority of unwanted messages being intercepted, spam senders regularly adapt their techniques and often send their messages from a new e-mail address each time. So, don't expect filtering to eliminate all spam.

However, Outlook also makes it possible to filter all e-mails that are sent to a specific e-mail address. This is easy enough to set up and provides a far more powerful method of avoiding junk.

The majority of ISPs offer their customers a number of e-mail addresses for each account. If you have a spare e-mail address, use that one each time

you fill in a form, register at a Web site, enter a competition and so on.

Now create a rule for diverting e-mail sent to your spare e-mail address: choose *Tools-Organise*. A box will open in the top section of Outlook and ask you to create a new rule. Using the drop-down menu, make a rule that reads 'Create a rule that moves message To (your spare e-mail address) into Junk e-mail'.

Backing up e-mails

It is usually people who have lost all their data in the past who become regular backup fanatics. But it's not necessary to learn the hard way and you'd do well not to let this happen to you. Outlook stores all your information in Personal Folder Files and these can be recognised by their PST extension.

To back up everything contained in Outlook you simply need to find your PST files and copy them on to a writable CD. The safest method is to store your backup CD in a different building altogether. That way, even if your PC were to be completely destroyed by fire, flood or other random disaster. the Outlook data would remain safe.

To find and back up Outlook's Personal Folder Files, first close Outlook, then go to the *Start-Search-Files or Folders*. Type **.PST* into the Search box to bring up all files with the PST extension and then copy these files to CD.

Sending invitations

Having a combined contacts list, calendar and e-mail facility makes scheduling a meeting over e-mail very convenient. Whether it's for business or pleasure, this facility is well worth learning about — especially if your friends and colleagues also use Outlook.

In the Outlook Calendar, choose *File-New-Appointment*. In the appointment box, enter the details of your suggested meeting and its proposed location.

Next, click *Invite Attendees* and a new line will appear in the appointment box for entering e-mail addresses. Now click on the *To* box on the left of the new line. You will then be able to pick the people you want to invite from your contacts list.

Once the invitees have been chosen, click *Send* and the invitation will be e-mailed. All the people receiving your invitation will have the option of either declining or accepting the meeting. If they accept, the appointment will automatically be inserted into their Outlook calendar. Once the invitees respond, your calendar will be updated accordingly.

With the latest version of Outlook, invitees can suggest an alternative time for the meeting which, if agreed on, will be changed on all the calendars.

If your invitees do not use Outlook they will still receive an e-mail with the appointment details but the automatic calendar entry will not function.

Contact management

To make the most of the e-mail and calendar facilities, make sure the information in your Contacts list is correct and up to date.

An interesting function of Outlook is the ability to bring up a detailed history of all your correspondence with a particular person in your Contacts list. To do this, go to the Contacts screen, double-click the contact in question and a box will open containing their details.

Click on the *Activities* tag and Outlook will search through its e-mail files (including the archive) and list all messages and invitations that have been sent to and received from that person.

One problem for all Outlook users is how to display your contacts information in a way that is both maximally efficient and pleasing to look at. By default, contacts are listed in 'address cards' form, which works quite well if you have a small number of contacts or all the entries in your contacts list contain the same kinds of information. Unfortunately, this is rarely the case. To check the available options, choose *View-Current View* and pick from the list.

As it is unlikely that all your contacts will have all their details filled in, the Phone List option is a good idea. This displays all your contacts in a list, one on each line.
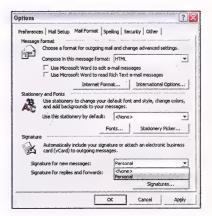
To change the fields by which contacts are sorted, right-click on one of the fields and then pick *Field Chooser*. A box will open displaying all the available fields. It then allows you to drag and drop different fields to customise the display to your preference. ■

SIGNING YOUR E-MAILS
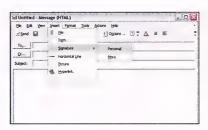
Often, an e-mail signature is used to send basic contact information about the sender such as name, company, telephone number and Web site. However, it can be used for anything (perhaps a quote or short joke). But just remember, it will be attached to every e-mail you send.

1. Click *Tools-Options* and select the *Mail Format* tab. Click *Signatures* and then click *New*. Decide on a name for your signature, make sure 'Start with a blank signature' is selected and click on *Next*. Type in your signature text and click *Finish*.

2. You also have the option of attaching your signature to only selected e-mails. Click *Tools-Options* and select the *Mail Format* tab. Next to 'Signatures for new messages' click on the drop-down menu, select *None* and click *Ok*.

3. To attach your signature to an e-mail message, click *Insert-Signature*. Click on the one you want to use.

Plus! Digital Media Edition

With each successive release of Windows, Microsoft bundles yet more third-party functions. Audio, for instance, became an integral part of Windows 98 with the addition of Media Player. XP brought us a whole lot more: remote access, digital still and video imaging, CD burning, and file compression, to name but a few.

So, what could possibly be left to add? Why, more multimedia, of course. Enter the Digital Media Edition (DME).

The whole package, for around $45, carries more than a hint of frivolity. Among the more novel provisions are a CD labelling add-on, more skins for Windows Media Player, an alarm clock that can be set for timely wakeups or reminders, and a selection of 3D dancing desktop characters that very quickly become only marginally less annoying than Clippy the know-it-all paperclip Office assistant.

Movie Maker add-ons

The inclusion of a video-editing package in Windows XP took the complexity out of the genre and brought fast, effective filmmaking to the desktop. Version 2.0, available to all via the Windows Update Web site, ironed out some glitches to turn Movie Maker into a truly useful tool.

Media Edition adds 50 editing options to the mix, with effects ranging from the artistic Watercolor to the exotic Color Warp, and a collection of transitions that let you drain, erode and evaporate clips from every conceivable direction. It's a bundle that will no doubt be welcome to most users, though, as ever with such effects, beware of overuse.

Photo Story

The idea behind Photo Story is that, while your images might not move, you can pan and zoom around them to create a still 'film' consisting of a series of static shots. Add sound, titles and credits to compile a mini-movie, and e-mail the resulting WMV file to friends or colleagues.

Photo Story is certainly an appealing alternative to attaching a bunch of digital photos to an e-mail, and it saves having

Photo Story in Plus! Digital Media Edition lets you create narrated slide shows from still photos.

to throw a post-holiday slideshow evening, but Movie Maker already allows this kind of approach with still images. Furthermore, not only is Movie Maker free but it also provides much more flexibility than Photo Story's very basic 'advanced' panning and zooming options.

Photo Story is nevertheless a neat extra, even if you already have one of the many free photo viewing utilities such as IrfanView or PhotoExplorer. Those unsure of making their first steps into digital video editing will appreciate the simplicity of Photo Story's stripped-down functions and automated approach. Its integration with the Windows platform can't fail to make slideshow sharing that bit easier, too.

Audio Converter and Analog Recorder

For music fans, Microsoft has partnered with Sintrillium (maker of Cool Edit Pro) to bring DME users analog recording and audio conversion software. Audio Converter lets you change the format of music files to and from MP3, WAV and Microsoft's own WMA — a handy feature for those who use a variety of devices for music playback. The software is again wizard-based, handholding you through the conversion process and taking care of the more technical aspects of the procedure to guard against loss of quality.

If you are looking for a quick, easy solution for getting all your vinyl records and tape cassettes onto your PC, you'll welcome Analog Recorder. It's another conversion tool, which this time allows you to copy your ageing analog audio into digital format, and eliminates background hisses and pops into the bargain. In keeping with the other utilities in DME Audio Converter it's nice and simple, automating most of the process for you.

Party Mode

Party Mode lets you use your PC as a jukebox, utilising Windows Media Player in full-screen skin mode to stream a continuous playlist from your hard drive. There's the option to add a scrolling message, too — perhaps a note to welcome guests as they arrive. Importantly, you can choose to block access to your desktop while in Party Mode but allow partygoers to reorder tracks just as they might control the comings and goings of CDs in and out of your hi-fi.

No shindig would be complete without some dancing, and Digital Media Edition throws in a selection of choreographed performers to turn your desktop into a dance floor. You can download more from Microsoft's site, as well as medium and large versions of these real-life twirlers. Be warned, though, even at the smallest size these video files run to megabytes. ■

Enable next-generation networking

O ccasionally, something unusual and interesting pops up on Windows Update. Recently, it was the 817778 Recommended Update, or in more human-parseable terms, the Advanced Networking Pack (ANP) for Windows XP.

The ANP contains a new stack for the Internet Protocol version 6 (IPv6), which is part of the Next Generation Internet, said to succeed IPv4 that's been around since the 1970s. A full discussion of all the features of IPv6 is beyond the scope of this article, but if you are interested, take a look at **www.microsoft.com/windowsserver2003/technologies/ipv6/default.mspx**.

Although not many users have discovered it, Windows XP has had IPv6 support for a while, but really only in a fairly 'raw' form. It had to be enabled and managed via the command line, and other operating system networking components like the Internet Connection Firewall (ICF) were not aware of it.

Once you install the ANP, check the Properties page for your network connections (i.e., from the Control Panel or via *My Network Places-View All Network Connections*), where you'll see a Microsoft TCP/IP version 6 entry.

Although Microsoft refers to the new IPv6 as "production quality", the GUI management and monitoring tools for it are still not ready. Instead, you have to fire up a CMD box, and use the **netsh** command-line utility — most of the IPv6 options and commands are under the **netsh interface ipv6** context. For example, if you want to see the IPv6 address of your computer, type:

```
C:\>netsh interface ipv6 show address
Querying active state...

Interface 5: Teredo Tunneling Pseudo-Interface

Addr Type  DAD State  Valid Life   Pref. Life   Address
---------  ---------- ------------ ------------ -------------------------
Link       Preferred     infinite     infinite fe80::5445:5245:444f

Interface 4: Local Area Connection

Addr Type  DAD State  Valid Life   Pref. Life   Address
---------  ---------- ------------ ------------ -------------------------
Link       Preferred     infinite     infinite fe80::2d0:b7ff:fecd:1cfe

Interface 2: Automatic Tunneling Pseudo-Interface

Addr Type  DAD State  Valid Life   Pref. Life   Address
---------  ---------- ------------ ------------ -------------------------
Link       Preferred     infinite     infinite fe80::5efe:192.168.1.20

Interface 1: Loopback Pseudo-Interface

Addr Type  DAD State  Valid Life   Pref. Life   Address
---------  ---------- ------------ ------------ -------------------------
Loopback   Preferred     infinite     infinite ::1
Link       Preferred     infinite     infinite fe80::1
```

With the ANP installed, you get an IPv6-cognisant ICF; it is enabled automatically when the new IPv6 stack is installed. If it is disabled and you want to start it up again, go to *Control Panel-Add/Remove Programs* and start up the *Add/Remove Windows Components* wizard; then, select *Networking Services*, and click the *Details* button. In the dialogue box, tick the *IPv6 Connection Firewall* box, and click *OK* to close the open dialogues.

The IPv6 ICF is also managed through the **netsh** command, but this time in the **firewall** context. This command shows the port settings for P2P grouping and peer name resolution protocol:

```
C:\>netsh firewall show globalport

Description        OpenPort        Protocol
-------------------------------------------
P2P (Grouping)     3587            TCP
P2P (PNRP)         3540            UDP
```

MS P2P

Also included in the ANP is the Microsoft Peer-to-Peer (P2P) Networking component, which lets you build distributed computing networks with PCs acting as both clients and servers for a variety of applications. Yes, it's similar to the old-style server-less networking, but with robust security and, better yet, it runs over IP and not just a local, Thin Ethernet LAN.

It's easy to enable the MS P2P client: you'll find it in the same place as the IPv6 Internet Connection Firewall, under Add/Remove Windows Components. Note that by enabling P2P, you'll open up two IPv4 ports — TCP 3587 and UDP 3540 — for P2P grouping and name resolution.

While P2P uses IPv6 as its network layer, the architects behind the Next Generation Internet are pragmatic enough to realise that IPv4 will remain deployed for a very long time. Therefore, coexistence between the two protocols is necessary, and the MS P2P client is able to traverse IPv4 network address translation (NAT). For example, many LANs use Private Class A, B or C RFC 1918 addresses which are not routable over the Internet, but NATs to a public interface with an Internet-routable IPv4 address. This saves precious and costly IPv4 address allocations, but creates problems for tunnelling IPv6 in IPv4 packets (also known as 6to4).

To solve this, MS has implemented Teredo or NAT-T for the P2P client, to make 6to4 tunnelling work in real-life network situations. In fact, Windows XP is now able to act as a 6to4 router, with Internet Connection Sharing enabled, for the rest of your network.

Next month, we plan to look at a practical example: tunnelling IPv6 traffic over IPv4, using 6to4 and Teredo with Windows XP Professional. ■

Easy-to-use Knoppix 3.2

Have you considered trialling Linux, but you're unsure how to go about reorganising your hard drive to run it? Or are you already a Linux user who is frustrated by having to regularly use Windows on other computers? Knoppix (**www.knoppix.org**) is a Linux distribution that solves both these user issues, and more. Knoppix can run entirely from CD and does not require any hard disk space on your PC. To run Knoppix you need a system with 128MB of RAM, a VGA video card and a CD-ROM drive. The Knoppix CD allows you to use Linux on any computer immediately, without needing to perform an installation.

Removing Knoppix is easy: simply eject the Knoppix CD and reboot your PC. Included with the Knoppix Linux distribution are some of the best applications available for Linux, including the KDE 3.1 desktop, OpenOffice.org 1.0 and over 900 other programs.
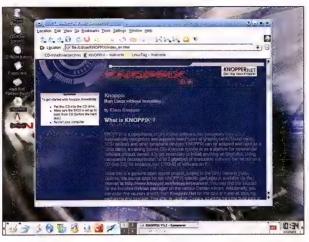
Getting started

To start Knoppix, place the CD (included on the cover of this month's issue) in your CD-ROM drive and boot your computer. If your computer does not automatically boot into Knoppix, you will need to configure your system BIOS to boot from the CD-ROM drive.

To configure your system BIOS, consult the motherboard or system manual that came with your PC for instructions. The system BIOS contains a menu that will allow you to decide from which device on your system to boot — hard disk, floppy disk, or CD-ROM. If you are unsure about configuring your system BIOS, a PC-savvy friend should be able to assist.

If you're new to Linux — and many of you may be — the Knoppix desktop may look different to what you are accustomed to. After spending some time familiarising yourself, you will discover more similarities to a Windows desktop than you initially realised.

In the left corner of the toolbar running along the bottom of the desktop is the K button. Click on this button to show a list of programs available on the system. Located next to the K button are several launchers for commonly used programs

The attractive Knoppix desktop is based on KDE3 and is easy for new users to pick up.

such as Mozilla and OpenOffice.org.

To the right of these buttons you will see a box divided into four regions. This is your virtual desktop navigator. KDE gives you four workspaces on which to organise your windows. You can switch between desktops by clicking on the virtual desktop navigator. On the desktop you will find icons for accessing your CD-ROM and hard disk.

Configuring an Internet connection

Knoppix provides wizards for configuring most of the popular types of Internet connection. To access the wizard for your connection, click on the *K* button and select *KNOPPIX-Network/Internet* from the list. Select the appropriate wizard and follow the prompts to configure your Internet connection. You may need information such as your ISP's phone number, DNS servers and login information to complete this process.

Saving settings to disk

If you boot Knoppix directly from the CD-ROM — which is a read-only medium — your system settings, such as the layout of your desktop and any configured Internet connections, will not be saved when you shut down. You can save your settings between Knoppix sessions using most forms of removable media, including floppy and Zip disks. To save your settings, click on the *K* button and select *KNOPPIX-Configure-Save Knoppix Configuration*. From here you will be

asked to select the settings you would like to save from a list. Next you will need to select a device (such as a floppy drive) from the available devices on your system. Select the appropriate device, insert a blank disk and click *OK* to save your system settings.

Going home

If you want to use Knoppix without regularly performing the above process to save your settings, you can create a persistent home directory for your files and settings on a hard disk or floppy/Zip disk. If you don't employ a persistent home directory, any files you save while in Knoppix may be deleted on reboot.

If your computer normally runs Windows 95/98/Me, you can create a persistent home directory by clicking the *K* button and selecting *KNOPPIX-Configure-Create a Persistent KNOPPIX Home Directory*. Currently, Knoppix does not support writing to NTFS formatted disks, so if you use Windows XP/2000 you may not be able to save to your hard disk and instead should use a floppy or Zip disk.

If you're new to Linux, Knoppix is worth experimenting with before taking the plunge and installing a full Linux distribution. For experienced Linux users, Knoppix offers a handy way to take your computer with you in your briefcase. No matter where you are, you can always access the same software in a familiar environment. Knoppix also makes a great rescue CD for system administrators. ■

From Mac to videophone

Whether you want to create video e-mail to send to loved ones or to facilitate video-conferencing with friends and colleagues, Internet cameras (also known as webcams) can be both functional and great fun. Companies such as Logitech (**www.logitech.com**), iREZ (**http://irez. globalmedia.com**) and ADS Technologies (**www.adstech.com**) all make OS X webcams, but now Apple has its own, called iSight (**www.apple.com.au/isight**). iSight is used with iChat AV, a free program (currently in beta version) that makes video-conferencing under OS X easy.

iSight and iChat

With a metallic design in keeping with Apple's new G5 desktop range, the $259 iSight ships with several mounting options. It requires a minimum 600MHz G4 processor, OS X 10.2.5 or later and a broadband connection. Featuring a built-in microphone and ¼in CCD sensor, the FireWire device is capable of capturing resolutions up to 640x480 at 30 frames per second (fps) in 24-bit colour — that's TV quality, depending on your hardware (see this month's First Looks page 28 for a full review). For its part, iChat AV is essentially a tweaked audio-visual-capable update of Apple/AOL's instant messenger software.

Installing iSight requires following only a few steps in the provided manual, and no drivers are needed.

Your first step is to download and install iChat AV from **www.apple.com.au/ichat**. If you've used iChat before you should find that, when started, iChat AV will automatically import your buddy list. To change account details, go to *iChat-Preferences* and select the *Accounts* icon. Here you can enter your AOL screen name or .Mac account information. The drop-down box allows you to create a .Mac account. Although there are many benefits to purchasing a $189 .Mac account (see **www.mac.com** for more information), if you're only looking to chat you may as well just register a free AOL screen name at **http://my.screenname.aol.com** and use that account information to sign into iChat.

All you need now is someone connected to iChat AV who also has a camera or a microphone. Add them to your Buddy list by going to *Buddies–Add a Buddy.* You'll notice that you have a green video icon next to your name, indicating your video capability. This system applies to those in your Buddy list also, with a phone icon signifying solely voice/microphone capabilities.

Simply click on either of these icons to initiate a voice or video chat session. When you're in a chat session, you should see yourself in a reduced picture-in-picture view.

If your friend has a microphone but not camera, you can still initiate a one-way video chat by clicking on that option in the *Buddies* menu. You've now turned your Mac into a video and voice phone without even paying long distance charges!

TIP: Clicking on your own video icon brings up a large preview window, so you can get yourself into frame, organise lighting and perhaps even fix your hair!

For anyone curious about video-conferencing with potentially interesting (yet unknown) strangers who traverse the Internet, one site has already sprung up to cater to this need: check out **www.myisight.com**.

Thinking differently

If your budget won't allow you to purchase an iSight webcam, there are alternatives. Those fortunate enough to own a FireWire DV camera should be able to use it easily with iChat AV without any additional steps required.

Those who already own a webcam (including ones originally developed for PCs) that have no OS X drivers may find the macam project (**http://webcam-osx. sourceforge.net**) interesting. The 'Supported Cameras' link lists the cameras that this free driver supports.

There are also steps you can take to get iChat AV working with USB webcams. See the Canadian Mac forum for more info: **www.ehmac.ca/cgi_binultimatebb. cgi?ubb=get_topic;f=1;t=003649**.

The free Yahoo messenger, available at **http://messenger.yahoo.com/messenger/ download/mac.html**, allows you to video-conference with PC users — something

Apple's iSight camera and iChat software look good and work well, but there are alternatives.

that iChat AV, at the time of writing, wasn't supporting.

Video-conferencing with PC NetMeeting users

Microsoft's NetMeeting software is one of the most popular video-conferencing programs available for PC users. Although it's not supported by iChat AV, Mac OS X users can video-conference with NetMeeting users using free software available at **http:// xmeeting.sourceforge.net**. Simply download the latest stable version of ohphoneX. Those who are a bit more IT savvy (such as Linux/UNIX users) might be interested in trying the OS X port of GnomeMeeting, which is also available from the site.

With ohphoneX installed and started, go to *Preferences* in the *ohphoneX* menu and select the *Video* tab. Make sure *Enable Video Receive* and *Transmit* are both ticked, then exit and restart the program. Now, just enter the IP address of the person who is using NetMeeting or ohphoneX, and you're set.

Capturing video

Finally, BTV (**www.bensoftware.com**) is a handy little OS X application that can record video and photos from your webcam as well as help you create a Web page where you can upload a snapshot of yourself at given intervals. It's easy to record, too: just click the *Capture Frame/Movie* buttons. ■

Sound cards explained

W hether you're a home theatre enthusiast, gamer or musician, selecting the right sound card for your needs should be an important consideration. Here's how to decide into which category your sound card needs fall, plus some general installation and connection tips to keep in mind when you're setting up.
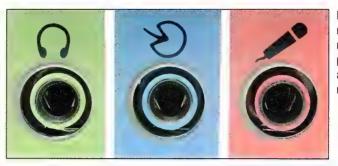
FIGURE 1: Most motherboards and many sound cards provide colour-coded audio connections to make life easier.

Choosing a sound card

Home theatre: if you're upgrading or piecing together a new PC, remember that new motherboards usually contain onboard or 'host' audio chipsets. They are generally adept at handling 5.1-channel surround sound or greater and are useful if you plan to equip yourself with a DVD drive and surround sound speakers for watching movies. If your motherboard doesn't have 5.1 ability, cards such as AOpen's $49 Cobra AW850 (**www.bluechipit.com.au**), Hercules's $89.95 Gamesurround Muse 5.1 DVD (**www.hercules.com**) and Creative's $99 SoundBlaster Live! 5.1 SE (**http://australia.creative.com**) represent good entry points.

Of course, this requires a set of surround speakers, which are available from companies such as Creative, Logitech (**www.logitech.com**) and Altec Lansing (**www.alteclansing.com**), and vary in features and price.

TIP: be sure to get surround speakers that match your surround sound card in terms of channels (5.1, 6.1, etc.) and connections. There are two main types of sound card-to-speaker connections for surround sound. The easiest to deal with is an optical S/PDIF port, which involves simply one glass or plastic fibre cable being connected from the sound card to the speakers. Conversely, sound cards with connectors for each separate channel require several matching colour-coded cables. The latter method is more common on cheaper sound cards and speakers.

Gaming: if you're keen to be immersed in the worlds created by the latest 3D games, your needs will be almost the same as those of a movie buff. The main exception is that you'll need a sound card capable of reproducing 3D sound the way the game developers intended. (See the Audio column in the January 2001 issue, page 106, for more information on gaming audio.) Your best bet is simply to check your favourite game's audio hardware requirements. Cards to consider as a starting point include the SoundBlaster Live! 5.1 SE and Hercules's $119 Gamesurround Fortissimo III 7.1.

Music production: although any sound card can suffice, the more advanced your production needs get, the more features and sound quality you require. The mid to pro level music-orientated sound card market has exploded and prices range from $300 into the thousands. External break-out boxes are available that provide easy access to ports and help reduce interference. Connectors include a 3.5mm jack (standard headphone jack), 6.5mm jack (the thicker audio plug type) and S/PDIF optical or coaxial (RCA). You should also consider your need for MIDI-in and -out ports.

Finally, if you only require basic functionality, options such as the AOpen Cobra AW840 retail for as little as $29 and Creative's SoundBlaster Vibra 128 for about $50.

Colour codes

Many audio connections use basic colour coding, as seen in FIGURE 1. Generally, the microphone will be pink, the standard single channel line-out or headphone will be green, and line-in will be blue. Consult your manual for the specifics of connectors, because both colours and icons that are supposed to help can sometimes confuse.

INSTALLATION TIPS

• Completely remove all previous sound card drivers and software. Install a new sound card as far as possible from other cards and devices in order to reduce possible interference.
• Many newer sound cards used in conjunction with newer CD/DVD-ROM drives allow digital CD playback using the drive's IDE cable connected to the motherboard. The older analog alternative requires a cable to be connected internally between your sound card and your CD/DVD-ROM drive. Check your manual.
• Ensure that the card's ports are aligned so cables can be plugged in securely and that the bracket is screwed in place.

INTEGRATION TIPS

• Before you invite friends around for a night of popcorn and movies, remember that you might need some connection adapters to convert certain cable connections from your card to those of your TV or hi-fi. For instance, you may need to buy a stereo 3.5mm to stereo RCA cord to run the output of your sound card to the input of your hi-fi. These are available from good electrical and hobby stores.
• Have equipment turned off or volume low when connecting cables; this will protect your speakers.
• Get to know your sound card's mixer controls. Using the standard Window's audio mixer (double-click on the speaker icon in your system tray), you can usually adjust bass and treble. If you require more bass or treble, select *Advanced Controls* in *Options* and then click the *Advanced* button.

SoundMAX, which makes audio chips for various motherboards, has designed a system called intelligent jack sensing that works in conjunction with a user interface to inform a user if they've used the wrong jack and let them switch things around easily using software. You can check for supported motherboards at **www.soundmax.com**. ■

GRAPHICS

BY SCOTT MENDHAM

Importing digital photographs with XP

In the past, getting the images from your digital camera to a PC was frequently a nightmare. Each camera model was different and required its own set of drivers. Plus, some cameras connected via a serial port, while others needed a USB connection — even though some operating systems such as Windows 95 struggled with USB.

Thankfully, problems are less common today. If your camera supports Picture Transfer Protocol (this includes most new models) and you have Windows XP Home or Pro, the transfer process should be a breeze. Start by locating the special USB cable that was (hopefully) included with your camera. On one end it will have a standard USB plug (see FIGURE 1): this will be connected to your PC. On the other end will be a much smaller plug that has sightly angled edges: this will be plugged into your camera (warning: many power cable plugs have a shape similar to this small plug, so be sure to double-check the connections). It is possible to force the plug in the wrong way and possibly damage your camera or USB port, so take care to ensure that the orientation is correct.

Now locate a spare USB port on your PC. Some keyboards, such as the Microsoft Internet series, have a few spare ports on the top back area of the board. This can be a convenient spot, but remember to check that the keyboard is connected to the USB port of your computer; otherwise, you won't be able to transfer the images. Another place to look for USB ports is at the front of your computer, because many new PCs have ports located under a small flap.
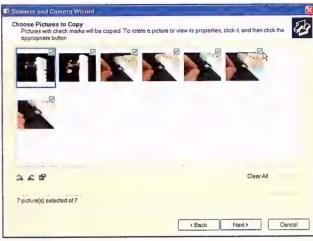
The best approach is to plug the USB into your computer before you plug in the camera. The reason is simple — this will stop you accidentally yanking the cord and possibly damaging the camera.

Now start Windows Explorer and note the drives that are present. Plug in your camera and — fingers crossed — two things will happen. A new 'drive' will appear with your camera's name (try hitting the **<F5>** key if it is not visible) and, if this is your first time connecting the camera, XP will ask what action you wish to take. Select the *Scanner and Camera Wizard*.

If nothing happens, consult your camera's manual to see if your camera needs to be turned on or off. Verify that the camera is working and the battery has some power. Check that the USB plug is secure and, if possible, try another USB device on the same setup. If you are still having problems at this stage, check the manual again or the manufacturer's Web site for additional tips.

FIGURE 2: The camera wizard lets you preview images and decide which photographs you want to transfer.

There are now two ways to get the images to your computer. First, you should decide if you are going to move the images or copy them. Moving means that they will be erased from your camera; copying means the files are kept both in the camera and on your hard drive. If you click on the camera 'drive' shown in Windows Explorer, the pictures will appear as normal files. Select the images you want and copy/move them to a folder on your system. That's all you need to do. They are now the same as any other graphics files on your computer.

XP's camera wizard may not suit every need, but it has some nifty shortcuts and management tools. After it pops up, it should display the model of your camera. Click *Next* to continue. The Preview screen (see FIGURE 2) is handy to determine which images to copy or delete. Plus, you can quickly rotate images by using the buttons on the bottom. The bottom-right button lets you take a picture while your camera is connected via the USB. On the next screen, choose a destination and a default name for the photos. For example, if you type in 'tiger' for the picture group, your images will be called tiger001.jpg, tiger002.jpg, etc. If you don't make changes to the group names or locations, XP continues numbering the photographs each time you import more images. ∎
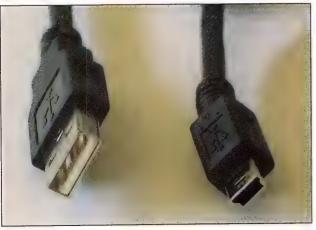
FIGURE 1: This shows both ends of a standard USB cable used for digital cameras. The larger plug, left, is connected to your computer. The smaller plug, right, is for the camera.

BY GAVIN SHERRY

PHP file system functions

This month, we will look at the range of functions PHP provides for interacting with the file system. At their most basic level, file systems interface storage media — generally hard disk drives — with applications. The most popular file systems in current use rely on the directory and the file as their most elementary concepts.

File system types

There are generally two types of file systems that PHP is used to access: Windows file systems and UNIX-like file systems. The key differences are that UNIX-like file systems can have file and directory owners, group permissions (access permissions for a group of users), read, write and execution permissions, and named links from one file to another. This means that some PHP file system functions may not be supported on some Windows variants, particularly Windows 95 and Windows 98. Consult the PHP manual (**www.php.net/ manual/en/ref.filesystem.php**) to see if a given function is available for your Windows version.

The other difference is in the separator used to differentiate one directory from another in a file path. Under Windows, a file path looks like this: 'C:\Windows\System\'. Under a UNIX-like system, it would look like this: '/etc/sysconfig/'. A backslash is used with Windows, whereas a forward slash is used with UNIX-like systems.

Retrieving file info

In previous columns we have looked extensively at opening, writing and reading files. What we haven't done is look at information associated with those files.

The following script generates this data and outputs it to the user. To use it, create a file "test.txt" and run the script.

```
01 <?
02 if(!file_exists("test.txt")) {
03      exit("You must create the file
'test.txt' before running this script");
04 }
05 $atime = date("r",fileatime("test.txt"));
06 $mtime = date("r",filemtime("test.txt"));
07 $ctime = date("r",filectime("test.txt"));
08 $fs = filesize("test.txt");
09 $uid = fileowner("test.txt");
10 $pwd = posix_getpwuid($uid);
11 $owner = $pwd["name"];
12 $ft = filetype("test.txt");
```

```
13 $perms = fileperms("test.txt");
14 $permstr = $perms & 0x0100 ? "r" : "-";
15 $permstr .= $perms & 0x0080 ? "w" : "-";
16 $permstr .= $perms & 0x0040 ? "x" : "-";
17 $permstr .= $perms & 0x0020 ? "r" : "-";
18 $permstr .= $perms & 0x0010 ? "w" : "-";
19 $permstr .= $perms & 0x0008 ? "x" : "-";
20 $permstr .= $perms & 0x0004 ? "r" : "-";
21 $permstr .= $perms & 0x0002 ? "w" : "-";
22 $permstr .= $perms & 0x0001 ? "x" : "-";
23 echo "File test.txt\n".
24 "Last accessed: $atime\n".
25 "Last modified: $mtime\n".
26 "Last changed: $ctime\n".
27 "File size: $fs bytes\n".
28 "Owner: $owner\n".
29 "Permissions: $permstr\n".
30 "File type: $ft\n";
31 ?>
```

At the start of the file, the script tests to see if "test.txt" exists; if not, it exits. On line 05 the script generates a date-time string of the last time the file was accessed, with the fileatime() function. This function returns a UNIX timestamp (that is, the number of seconds since 1970). This is passed to date() to make a human-readable date-time string. The same is done for the last time the file was modified (with filemtime()) and the last time the file meta data, such as permissions, ownership and so on, was changed (with filectime()).

On line 08, the script retrieves the file size. Lines 09-11 retrieve the username of the file's owner. Line 09 obtains the user ID of the file owner; line 10 looks up the user details in /etc/passwd via posix_getpwuid() (UNIX-like systems only); and, line 11 retrieves the username from the array returned by posix_getpwuid().

On line 12, the script gets the file type information.

Lines 13-22 generate a permissions string for the file commonly used on UNIX-like systems. The string represents the read, write and execute permissions for the file owner, the group the owner belongs to, and everyone else. For example, a permission string of 'rwxr-x---' means that the owner can read, write and execute the file, that users in the same group as the file owner can read and execute the file, and that everyone else has no permission to interact with the file.

Finally, all this information is output to the user.

Next month we will look further at interacting with the file system via PHP. ■

DIGITAL VIDEO

BY DENIS GALLAGHER

Improvements in Premiere Pro

A dobe Premiere continues to dominate the video editing market, particularly in the enthusiast to semi-professional arena. This month we take a look at a couple of the exciting new features to be found in Premiere Pro.

Workflow changes

Premiere Pro is a significant change from the previous version, providing the user with new professional effects, stronger audio and colour tools, and more control over the workspace.

Many of the menus, buttons and icons have been altered to more closely resemble other Adobe applications such as After Effects or Photoshop, and editing improvements bring Premiere Pro more in line with professional editing applications such as Apple Final Cut Pro 4 and Avid Xpress DV.

The ability to work with multiple sequences within a timeline window should please anyone working on a variety of footage within a project. This nesting feature has been available on high-end video editing packages for a while, and will save you time when it comes to trimming video or adding an effect.

Transitions can now be applied to any video track, with the ability to add transitions onto overlapping clips. The ripple delete feature, where a clip automatically takes up the slack following a change in the timeline, will please anyone who likes to experiment. You can select and trim multiple clips at once or cut and paste groups of clips to a timeline, knowing that Premiere Pro will now automatically integrate the changes into the project timeline.

Colour correction has always been an area in which Premiere has lagged behind applications such as Apple Final Cut Pro 4 and Sonic Foundry's Vegas 4, so three-point colour correction is an important new feature in Premiere Pro. Select a clip and adjust the hue, saturation and brightness for highlights, midtones and shadows, or replace a colour throughout a clip.

Audio improvements

Audio is an area where, in the past, Adobe's product has not performed strongly when compared to competing programs such as Sonic Foundry Vegas and Ulead MediaStudio Pro.

New functionality has been added to the audio tools introduced in Premiere 6.5, and effects can now be added at the track level, as well as to individual clips. This method is more elegant than applying effects to a large number of clips in a track. You still need to conform to Premiere's workflow design; for example, all imported audio references are automatically converted to 'conforming' audio files, although this conversion would have to take place before exporting to the final project in any case.

Premiere Pro has added Voice Over capabilities, a great feature for anyone producing a documentary or family video. You can now talk directly over a video track and a separate audio track will be laid down in real time.

Control and preview in audio has been improved dramatically, with the ability to adjust audio effect parameters and quickly preview the results. In previous versions, audio effects would preview the first eight seconds of a clip while making adjustments. Premiere Pro will allow for all or part (loop) of the clip or track to play while making adjustments. If 'toggle animation' is turned on, keyframes will be created with each parameter and time change.

The ability to get down to sub frame level is an exciting aspect when working

Adobe Premiere Pro offers stronger audio and colour correction tools, as well as the ability to alter the interface to suit the way you work.

with audio, as you can now work on a minute level with any inconsistent audio aspects that you want to change. In the past, the limit would have been one-thirtieth of a second (or one frame).

Premiere Pro forces all of your audio in a project to work as 32-bit 'conformed' audio files. This means that Premiere is uncompressing your audio into working files that can be edited to a much greater degree than previously possible.

Easier DVD creation

Another strong feature in Premiere Pro is its added functionality when working with video for DVD creation. Unlike Premiere 6.5, you can now encode to MPEG-2 and burn from the timeline with chapter markers, saving a lot of time when working on simple projects. DVDs burned directly by this method are set for auto-play upon insertion into a DVD player. Although you may want to tweak the menus and audio for larger projects, the 'export to DVD' function is a perfect way to look at a work in progress.

Next month, we will take a look at how Premiere Pro works with video clips and show you how the improved handling will save you time when editing and incorporating effects into your video project. ∎

HELPSCREEN

WINDOWS

Windows 98/Me/2000/XP

When a Windows update makes things worse

Q A recent Windows Update has destabilised my system. Is there a way to undo these patches?
– Bob Catanzano

A Microsoft provides ways to undo disastrous updates, but they don't work with every patch. Let's hope that one of the solutions below will work for you.

Start with Control Panel's Add/Remove Programs applet ('Add or Remove Programs' in Windows XP). Select *Start-Settings-Control Panel* (*Start-Control Panel* in Windows XP). Double-click *Add or Remove Programs*. Updates will be listed on the *Install/Uninstall* tab (Windows 98 and Me) or under *Change or Remove Programs* (Windows 2000 and XP). And yes, uninstalling major upgrades such as Internet Explorer 6 and Windows Media Player 9 with this applet will reinstall earlier versions of the programs.

Next, try Windows Update itself. Select *Start-Windows Update* or *Start-All Programs-Windows Update*. Click *View installation history* in the left panel to see a list of the updates you've downloaded and installed. Many of the entries include a *Read more* link (see FIGURE 1). Click that and scroll to the bottom of the resulting browser window for uninstall instructions. Unfortunately, they may just tell you to use Windows' Add/Remove Programs or that "Uninstall is not available".

If your PC's problems started after you updated a hardware driver in Windows
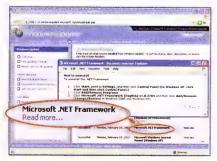
FIGURE 1: Find out how to uninstall a Windows Update via Installation History's *Read more* option.

XP, right-click *My Computer-Properties-Hardware-Device Manager.* In Device Manager, expand the appropriate device category. Right-click the device that has the bad update and select *Properties*. In the next dialogue box, click the *Driver* tab, and then the *Roll Back Driver* button. Follow the prompts from there.

Finally, try restoring your system's Registry to an earlier incarnation. Rolling back your Registry could make things worse, so back up the Registry beforehand.
– Lincoln Spector

Windows Me

Error message on startup

Q When I start up Windows Me I receive the message "Error loading nvqtwk.dll. System cannot find the file". When I click *OK* everything works fine. Can I stop this message from appearing? I also see the outline of a window named Mixer Untitled on screen for a few seconds before vanishing. Can I stop this happening?
– Name not supplied

A From its name, we deduce that the file nvqtwk.dll is something to do with NVIDIA graphics card drivers. Your display is working, so either the file is a leftover from an earlier graphics card that you've since upgraded or it's used by some Control Panel or configuration tool for your graphics card. Probably the best solution is to reinstall the software for your graphics card.

If the file isn't needed, use the System Configuration Utility (*Start-Run,* then type **Msconfig**, select the *Startup* tab) to determine the program that's trying to use the missing file by disabling things one at a time.

The Mixer window you describe seems like it belongs to a utility that normally runs hidden and is possibly represented by an icon in your System Tray. It may be one of the applications that came with your sound card.

If the window stays on screen for a few seconds before disappearing, it does so because the programmer wrote the code that way. You'll either have to live with the behaviour or do without the Mixer utility altogether.
– PC World staff

Windows 95, 98, Me

Missing Recycle Bin icon

Q I'm running Windows 98, which is fully updated. On several occasions I close Windows Explorer and notice that the Recycle Bin icon has been replaced by something else. This icon remains in place until I reboot. The Recycle Bin still works normally and its caption is correct, but is something malicious on my system causing this?
– Name not supplied

A This phenomenon isn't caused by anything malicious; it's just that Windows 98 (and 95/Me) is not very robust. For performance reasons, Windows maintains a cache, in memory, of all the icons it needs to display on the desktop and in Explorer. This cache can become corrupted if a program doesn't behave correctly. The most common cause of the corruption is a memory leak: this occurs when a program doesn't release all the memory it used before closing.

It's quite a common programming error. With patience, you might be able to identify the culprit, as you should find that the icon change occurs only after one particular program has been used. However, the problem can only be cured either by not using the offending program or by obtaining a new version that doesn't have the memory leak. It isn't something you can fix yourself.

If you don't want to wait until you reboot to repair the icon, here's a workaround that will force Windows to rebuild its icon cache. Right-click the *Desktop*, click *Properties* and select the *Appearance* tab. In the Item list box select *Icon*. Click the up arrow button beside the Size field to increase the icon size by 1 (see FIGURE 2), then click *OK*. Wait, and Windows will redraw the icons.

FIGURE 2: Change the icon size to force Windows to rebuild a corrupted icon cache.

Now click the down arrow button to restore the correct size and click *OK* again. Your Recycle Bin icon should now be correct.
– *PC World staff*

HARDWARE

Take a crash course in emergency PC recovery

TIP Sooner or later, a faltering hard disk, CPU or other component will bring your PC to its knees. If a dead machine means you can't do your job, the failure may bring you to your knees as well, begging your boss or an angry client for mercy.
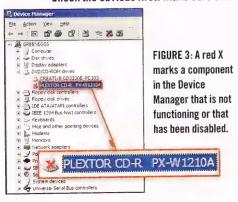
Waiting for the IT department or the local repair shop to fix your system, or arranging to use a loaner machine, can cost you hours of valuable work time. What you really need when disaster strikes is a way to get up and running quickly.
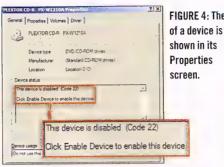
First, find out what caused the problem: wisps of acrid smoke wafting from your monitor's case, for example, send a very clear message. Unfortunately, the source of problems is rarely so obvious. Maybe a chip has failed, a Windows driver has been corrupted, or a cable has come loose. You can easily lose countless hours just trying to figure out what's wrong. Always remember the first rule of do-it-yourself PC repair: know when to quit.

Or at least know when to ask — or pay — for expert help. Place a dollar value on an hour of your time and keep tabs on how much 'money' you've invested as you go. It probably won't be too long before paying your PC maker's tech support line will seem like money well spent.

Save time by being prepared. When an airplane starts to sputter, the pilot pulls out a checklist and performs tasks that are known to work. Here's a troubleshooting checklist for your PC.

Check the obvious first: make sure that

FIGURE 3: A red X marks a component in the Device Manager that is not functioning or that has been disabled.

all your power switches are turned on, and that your cables and cords are securely connected. Don't forget to check the fuse or reset switch on your surge protector.

Look in Device Manager: Windows' Device Manager will tell you if a component isn't working properly. To open Device Manager in Windows 98, Me and 2000, right-click *My Computer* and select *Properties* (or press **<Windows>-<Break>** if you have a Windows keyboard) to open System Properties, and choose the *Device Manager* tab. In Windows XP, open System Properties as described above, select the *Hardware* tab, and click the *Device Manager* button.

A red X or a yellow circle with an exclamation point appearing next to the name of a device indicates a problem (see FIGURE 3). Double-click the listing to display the device's Properties screen, and then look in the 'Device status' box for more information (see FIGURE 4).

Test your suspicions: if you think a sound card, network adapter, CD-RW drive or other device is misbehaving, disable it and see if the problem goes away. Open the device's Properties dialogue box as described above. Under the *General* tab, choose *Disable in this hardware profile* (in Windows 98, Me and 2000), or *Do not use this device (disable)* on the 'Device usage' drop-down menu (in Windows XP).

Check the plumbing: turn off and unplug your PC, open its case, and make sure every cable, cord and connector is properly attached. Before you start handling your PC's internal workings, make sure that you're properly grounded. It's best to use a grounding wrist strap, but you can also discharge yourself momentarily by touching an antenna, water pipe or other grounded object.

Sometimes detaching a connector and then reattaching it will take care of the problem. Likewise, expansion cards suffer from 'creep' — they slowly work their way

FIGURE 4: The status of a device is shown in its Properties screen.

FIGURE 5: Find your driver's version on the *Driver* tab in its Properties dialogue box.

out of their motherboard slots. Carefully remove and replace them to ensure that they're properly reseated.

Try a different driver: many hardware problems arise from conflicts relating to a device's software drivers. Check the Web site of your system or device manufacturer for updates. To find the version of your currently installed driver, open its Properties dialogue box as described above and click the *Driver* tab (see FIGURE 5). Windows XP has a handy button on the tab that lets you reinstall an old driver when a newly installed one causes problems. (This happens more often than you might think, especially with graphics card drivers.)

Perform some tests: running a hardware-diagnostic program such as #1-PC Diagnostics' #1-TuffTest will perform a thorough check of your PC's hardware. Download a limited free version off the cover CD. The more powerful shareware version of the utility is well worth the $US10 price, however.
– *Kirk Steers*

Resolving problems with mice

TIP If your mouse pointer freezes when you try to use it, the mouse probably just needs a good clean. Release the retaining ring holding the rubber ball, remove the ball and clean it using warm, soapy water. After drying it, rub it on your (clean) hand to remove any lint. Blow out any dust from inside the mouse casing and use a damp piece of kitchen towel to remove any dirt from the rotating parts.

Test that the two rollers spin freely: if they don't, the ball will slip against them instead of turning them, giving erratic pointer movement. If there is a problem with the rollers then it might be time to consider buying a new mouse, because it's hard to clean the bearings.

If your mouse stops working when it is in bright sunlight, it may be that enough

HELPSCREEN

light is penetrating the plastic case to interfere with the optical encoders inside. Try moving your mouse to a shady place.

Software problems can also affect mouse operation. If the pointer is locked solid, especially right from startup, you probably have an IRQ conflict. Use the Hardware Conflict Troubleshooter to resolve this.

You should also check that you have the right drivers loaded. Under Windows 95, 98 and Me, click *Start-Run* and enter **Sysedit**. In config.sys and autoexec.bat, type **REM** followed by a space at the start of any line that contains the word 'mouse'. In system.ini, ensure that the mouse.drv entry in the [boot] section reads:

```
mouse.drv=mouse.drv
```

and the 'mouse' entry in the [386enh] section reads:

```
mouse=*vmouse, msmouse.vxd
```

Save any files you changed, then reboot. If your mouse continues to play up, open *Control Panel-System-Device Manager*, expand the Mouse entry and remove any devices shown. Use Add/Remove Programs to delete any accessory mouse software such as Microsoft Intellipoint. Restart the computer, allowing Windows to redetect the mouse and reinstall its drivers. If all is well, reinstall the mouse software.
– *PC World staff*

INTERNET

Kerio Personal Firewall 2

TIP ZoneAlarm is the best-known free personal firewall, but it's not the only one around. Kerio Technologies' Kerio Personal Firewall is small (a 2MB download), easy to set up, and free to non-business users (business users pay $US39). Like
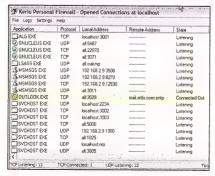
FIGURE 6: This easy-to-set-up firewall asks whether you'd like to allow applications to send and receive data over your network connection.

other high-quality firewalls, Kerio pops up dialogue boxes asking whether you'd like to allow applications to send and receive data over your network connection, and it can store your answer as a filtering rule for future reference. Kerio comes with a number of predetermined rules for network connections that are known to be safe (or unsafe), and it allows you to set up your own rules manually (see FIGURE 6). The program also shows the applications currently connected and active — a great way to spot Trojan horses and backdoor programs which you may have inadvertently granted network access. Download your copy of Kerio Personal Firewall from this month's cover CD.
– *Scott Spanbauer*

MISCELLANEOUS

Speed-up tips for an old PC
Does loading files on your old PC seem slow and deleting files take absurdly long? Here are some ideas for speeding it up a bit.

Take out the trash: a full Recycle Bin will make file deletion slow, so try emptying it. You could even try disabling the Recycle Bin altogether.

Run ScanDisk and Defrag: if all is well, these simple, routine housekeeping tasks should restore normal performance of the file system.

Safe and sound: if deleting files still takes a long time, try restarting Windows in Safe mode (hold down <Ctrl> during startup then select Safe mode from the menu) and then deleting some files. If the deletion is now faster, some driver or utility that is being loaded during a normal startup is causing the slowdown.
– *PC World staff*

Get the look you like

Q I prefer Windows Explorer's Details view. But in some folders, such as Control Panel, I want to see files represented as icons. How do I set the display view for a particular folder?
– *Joseph Allison*

A Begin by giving a folder the look you want the majority of your folders to have, and then select *Tools-Folder Options-View-Like Current Folder* (*Apply to All Folders* in Windows XP). Click *Yes* when prompted.

Scroll down to the option 'Remember

each folder's view settings', make sure it's checked, and click *OK*. Now your folders will open with the view you've chosen. If you alter the view of a folder later, you'll see the changed view when you reopen it.
– *Lincoln Spector*

Format Word paragraphs

TIP If you use the <Tab> key to indent your paragraphs in Microsoft Word or press <Enter> twice to put a blank line between paragraphs, there's a better way, especially if you'll be editing and reformatting the document. Before you start writing, select *Format-Paragraph* and click the *Indents and Spacing* tab. To indent the first line automatically, select *First line* in the *Special* field. To add a blank line between paragraphs, enter **12 pt** in the *After* field. Click *OK*. If you make these changes to your normal.dot file, they will affect all new documents.
– *Lincoln Spector*

Reminders with Myalert

TIP Maybe you don't need a big, complicated calendar and scheduling tool like Microsoft Outlook to manage the details of your life. You might be served better by a basic program that provides daily reminders of upcoming appointments, birthdays and meetings. You'd be hard-pressed to find a simpler daily organiser than Myalert. The program lets you set up reminders that appear once, monthly or annually (see FIGURE 7), and you can arrange for these to notify you from one to seven days in advance. Notifications occur only when you log in to Windows, so the application won't help if you stay logged in all day, every day. But after you receive your reminder, Myalert goes away, taking up no memory. And since the software is free, you have nothing to lose by trying it out. You'll find Myalert on the cover CD.
– *Scott Dunn* ■
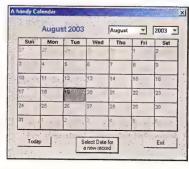
FIGURE 7: Add a new reminder by clicking the date of the event.

Need something more than just computers?

Computer Guide Third Edition

BY GEORGE SKARBEK

Most computer help books usually concentrate on one topic for discussion. As a result, bookstore shelves groan with titles on how to work Office XP, various Windows flavours and other tools like Photoshop. What if you want something that tackles the variety of problems you encounter when computing?

Skarbek's Computer Guide is one option for you to consider. This book is structured along Q and A lines, with questions Skarbek has received while writing help columns in newspapers and for the Melbourne PC User Group's PC Update publication.
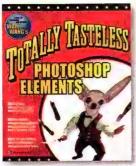
Topics journey across various areas of your computing environment from hard disk management, Windows, using the Internet through to networking and implementing a backup strategy. While some questions handle more advanced issues, such as networking PCs on a LAN for instance, many are of the beginner variety.

As well as the question/answer format, the book includes several tutorials, such as turning your vinyl LP collection into CDs, and keeping your Net connection running. Other useful topics include producing CD covers in Excel, and various Word walkthroughs.

Thankfully, this title doesn't cost the earth for its advice on troubleshooting and some readers may appreciate a book written by an Australian using questions asked by local readers. Skarbek also offers lots of general, independent tips like using free applications (Irfanview, for example, for image editing) rather than spruiking more expensive packaged software. After all, general-purpose PC users wanting simply to edit pics for e-mailing probably don't need a pricey packaged application with many high-powered tools.

If you've got some troubleshooting experience under your belt, this book might be too basic for you. On the other hand, it could be good for those relatives and friends who are always asking you to fix their PCs!
– Deanne McIntosh

Publisher: Skarbek Consulting **Price:** $32.95
Phone: (03) 9561 9932 **URL:** www.skarbek.com.au
ISBN: 0957929919

Totally Tasteless Photoshop Elements

BY WALLY WANG

Publisher: Osborne (McGraw Hill) **Price:** $44.95
Phone: (02) 9900 1800 **URL:** www.mcgraw-hill.com.au
ISBN: 0072228849

How can you resist a book with a coverline like "express your deepest secrets and fantasies artistically"?

Now that the term 'photoshopped' has entered the vernacular, everyone wants to get in on the fun of altering photos for weird and wacky results. This book is designed for Photoshop Elements users — so now you don't even have to shell out for the more expensive Photoshop package.
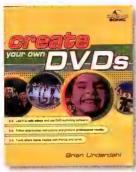
Really, the book is a selection of tutorials and tips for using Photoshop Elements and editing your digital pics. Where this book differs, however, is the tacky examples it uses.

The pictures are in colour so you can see what's going on and, interestingly, some of them are quite political in the US context — such as a picture of George W. Bush remade as a clown complete with purple hair and bright blue, pink and green facepaint.

The jokes behind some of the pictures escaped me, I have to admit (maybe I'm not tasteless enough?). That said, some readers will find this a more fun (albeit slightly expensive) way to get an understanding of the various techniques.
– Deanne McIntosh

Create your own DVDs

BY BRIAN UNDERDAHL

Publisher: Osborne (McGraw Hill) **Price:** $44.95
Phone: (02) 9900 1800 **URL:** www.mcgraw-hill.com.au
ISBN: 0072227311

Souped-up PCs and cheaper prices for DVD writers and digital camcorders have brought an upsurge in the popularity of editing videos. Whether you've tried this out at home or attempted authoring a DVD for work, you'll have found this is trickier than you've thought. Books like this one help make the process easier.

The book has sections on setting up a digital home video suite — including the kind of PC you'll need, video editing software (basic and with more features) and capture cards. There's also a useful section on the various DVD formats, which is something DVD movie creators will need to come to grips with.

The setup chapters are followed by sections on moviemaking basics like storyboards and timelines, transitions and special effects, creating audio tracks, and titles and menus.

To demonstrate some of the concepts, the book then walks you through video creation in various applications, such as Pinnacle Expression, Roxio VideoWave and Sonic MyDVD.

The accompanying CD includes software from Sonic like MyDVD 4 and Backup MyPC, rounding out this good, straightforward introduction to DVD moviemaking. ■
– Deanne McIntosh

Acquiring project skills

Reports from the IT industry suggest that demand for project management skills is starting to increase, and it is expected that enterprises will be looking to invest more capital in IT projects next year.

IT research group Meta Group reported recently that the lack of enterprise project management capabilities is a key IT workforce issue for 77 per cent of IT organisations globally. Fewer than 15 per cent of these organisations offered formal project management training. Furthermore, the report states that IT organisations that do not address the project management skills gap will face challenges in establishing IT credibility, demonstrating results to business stakeholders, and avoiding project failure. A fully trained and certified project manager will more likely establish realistic project performance baseline measures, identify and escalate issues, negotiate corrective actions and sensibly navigate political and cultural situations.

Range of courses

Specialised IT project management courses range from post-graduate to undergraduate to the globally recognised CompTIA IT Project+ certification. Course delivery varies from instructor-led to online, but most courses go beyond the theory to include a practical component and project simulations.

Tony Ma, Program Director of the Masters and Graduate Diploma in Project Management at the University of South Australia, said, "There is a realisation amongst students that project management is a growing career, which is not just confined to the construction and defence industries." The cost of courses for local students is approximately $9000, and studies can be taken over 12 months or part-time over two years.

What the courses cover

The non-profit Computing Technology Industry Association (CompTIA) provides technology standards for vendor-neutral technology certifications including IT Project+. CompTIA's IT Project certification is recognised as a global credential that validates the knowledge required to effectively plan, implement and complete IT-related projects.

The five-day IT Project+ instructor-led course run by New Horizons covers the following topics under Project Initiation: Discovery and Analysis, Estimating, and Framing a Project. Project Planning covers Laying the Foundation, Developing the Plan, and Building the Team. The remaining three topics fall under Project Execution, Project Control, and Project Closure.

The University of Western Sydney (UWS) provides two units of project management in each of the following degrees: Bachelor of Computer Science, Computing, Information Technology and Mathematics & Information Technology. The aim of the two units is to provide a real-world environment in which to develop a software application as a real project. This entails 'A stream' students visiting a business, working out its requirements and developing the software needed as a project. 'B stream' students have the client sourced for them by the university and do exactly the same work as A stream with the exception of client consultation. Each group has rigorous milestones to meet and deliver, as it is a real project with real deliverables. UWS also runs an elective unit on the human skills necessary for project management, such as leadership, motivation and meeting goals.

A working knowledge of either Microsoft Project or Primavera is necessary for all project management courses.

Demand and rewards

ICT recruitment company Candle has experienced a slight increase in demand for project managers, especially in the areas of application development and systems upgrades. A full-time project manager can expect to earn between $100,000 and $130,000; hourly contracting rates range from $70 to $90 depending on the duration of contract.

The project management role can be broken down into the following positions: management consultant, project administrator, project director, project leader, project manager and project planner, with different salaries for each depending on state or territory. According to the Icon IT index on **http://it.seek.com.au**, the salary for a project manager in NSW is $107,000; the lowest is in SA, at $73,000. The hourly contracting rate is approximately $70. ■

– Merri Mack

COURSE PROVIDERS

Australian Computer Society
Phone: (03) 9690 8000
URL: www.acsvic.com

Dimension Data
Phone: 13 1201
URL: www.ddls.didata.com.au/ddls
• CompTIA IT Project+

DP Education
Phone: (02) 9973 3777
URL: www.dped.com.au
• Successful Project Management
• Risk Management within IT projects
• Developing a Business Case for IT Projects

Monash IT
Phone: (03) 9903 2474
URL: www.monash-it.com.au

NETg
Phone: (02) 9460 2016
URL: www.netg.com
• Project Initiation & Fundamentals
• Project Control & Closure
• Project Planning & Execution

New Horizons
(combining SkillMaster & Spherion)
Phone: (02) 8263 5921
URL: www.nhaustralia.com.au
• Project Management Essential Competencies
• IT Project+

Project Managers Network
Phone: (02) 9924 3530, (02) 9214 9887
URL: www.pmnetwork.com.au

SelfCert
Phone: 1800 891 011
URL: www.selfcert.com.au
• Project Management Institute courses
• CompTIA IT Project+

The Hampton Group
Phone: 1800 002 641
URL: www.4PM.com/classes/index.htm
• Essentials of IT Projects
• Managing IT Projects

University of South Australia
Phone: (08) 8302 2238
URL: www.unisa.edu.au/gpb/index.htm
• Master of Project Management
• Graduate Diploma of Project Management

University of Western Sydney
Phone: 1800 897 669
URL: www.uws.edu.au/studyoptions/australian
• Computing project 1 & 2 part of four degrees
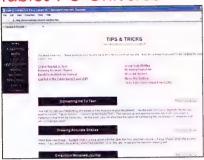• Professional preparation & project management (elective)

Windows Users Group Network

Hungry for computing tips? Annoyed that focus in recent times has shifted to newer versions of Windows like XP? At the Windows Users Group Network site you can get a new tip every day to help solve your Windows 95/98 and NT problems. There are also tips for PC hardware, Internet Explorer and Windows Office. Visitors not interested in checking back daily for a new tip can view a list on their chosen topic. You can also sign up for e-mail newsletters like shareware pick of the week.
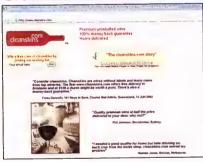**www.wugnet.com/tips**

Tablet PC Universe

Here's another tips and tricks site, this time focused solely on getting the most out of your Tablet PC. There are relatively few tips on the site — although perhaps enough for newbies — but this should change, as the Tablet format is a fairly new one and the number of products in the market still quite limited. The site has a facility for submitting your own tips for other Tablet PC users and there's a page of links to Tablet PC-related sites.
www.tabletpcuniverse.net/tips.htm

Cleanskins.com

No, we haven't gone all porn on you: cleanskins refers to bottles of wine sold unlabelled. Cleanskins.com sources the wine from wineries and sells directly to consumers from its site. Unlike other wine stores online, you don't have to trawl through pages and pages of wine listings because the choice is limited to a cabernet merlot, a chardonnay, a shiraz or a bubbly. Wines are sold for $108 per dozen (free delivery to Adelaide, Melbourne, Sydney and Brisbane; $20 elsewhere), which Cleanskins.com claims is half what you'd pay in bottle shops — although it's hard to compare without the labels.
www.cleanskins.com

Delicious Italy

If your holiday thoughts are turning to a gastronomic tour or residential cooking class in Italy, take a spin by Delicious Italy. The site has information on various tours plus recipes for those of us with budgets that won't stretch to European vacations. Recipes are grouped by region and you'll find other information on food and wine in Italy. Did you know there are over 350 different types of breads in Italy? The site lists them by region — a good resource for foodies contemplating a trip to Italy.
www.deliciousitaly.com/Recipes.htm

After a fashion

Now, you may not want to take fashion advice from the people behind a computer magazine, but we do know a good site when we see one — even if we aren't to be trusted on the latest fashion fad. Here are some you might want to visit to tweak your persona rather than your PC.

Focus On Style (**www.focusonstyle.com**) may look a bit like a dog's breakfast (disturbing for a site focused on looks), with its neon colours and variety of fonts, but it makes for a fun fashion read. Stories on tuning your style and solving fashion dilemmas are littered with hyperlinks, which means you can surf your way through clothes, hair and beauty articles.

It's actually lucky that you can cruise through the site this way because it's such a jumble of stories with slightly chaotic navigation that it wouldn't be easy to do it any other way. A little craziness and lots of enthusiasm, however, help alleviate this problem, and the advice is very accessible for anyone not on a fashionista's budget. The word from Focus On Style? Say no to scrunchies! (**www.focusonstyle.com/fussfree.htm**).

Of course, you can always turn to the offline authorities in fashion, like US Vogue magazine. At its site, **www.style.com**, you can see photos from major international fashion collections. The site also features pictures from society parties and pages on latest trends. Vogue's tips for autumn? Glamorous gloves and 'statement' boots are key accessories.

Generally speaking, men are less likely to visit fashion sites, but there's a wealth of advice on the Web for guys. How, for instance, can you miss tips for looking like you have a buff body when you don't? The Ask Men portal (**www.askmen.com/fashion/fashiontip**) has this and other clothing basics written for men. Warning: this site can offer some pretty annoying pop-ups.

There's even a site for that clothing anachronism — the tie. Tie Guide.com (**www.tieguide.com**) is a pretty basic site. Check out the first tip in the 'Wearing a tie' section: "don't wear a clip-on" — pretty sound advice, we'd say. There are also tips for buying a tie and looking after your collection.

However, where the Tie Guide.com will probably be more useful is with its step-by-step guides to tying a tie — complete with photos! So even if you work in the most conservative, tie-mandatory office, you can cut a swagger with a classy tie knot.
– Deanne McIntosh

Waterproof digital camera

The DSC U60 builds on Sony's stylish 'U' range of dinky digital cameras. The twist with this model is that it's waterproof, which means you can snap away on the beach or by the pool without worrying about damaging your equipment. It can capture images at depths of up to 1.5m at a resolution of 2MP. It has a special underwater setting to ensure you get the best results whether you are shooting in or out of the water.

Sony Cybershot DSC U60
VENDOR: Sony
PRICE: $599
PHONE: 1300 720 071
URL: www.sonystyle.com.au

Radio-equipped snorkel

Want to sing along as you snorkel? Well, okay, it might make more sense to hum in your head to prevent drowning, but if you fancy a soundtrack as you swim with the fishes, the Aqua FM Snorkel is what you need. To keep things simple it ditches headphones in favour of transmitting sound through your teeth and jawbone via a special mouthpiece. Simply turn the radio on, press the Tune button and it finds the clearest signal for you.

Aqua FM Snorkel
DISTRIBUTOR: Aquanaut
PRICE: $US129
PHONE: (02) 4966 4900
URL: www.aquasphereusa.com

Slim CD-RW/DVD combo drive

Noticeably slimmer than Sony's previous offerings, the CRX300A combo drive is an ideal choice for users with limited desk space. It reads DVDs at 16x, while CD ratings are an impressive 48x48x24x (read/write/rewrite). Sony's PowerBurn buffer underrun error protection technology (quite a mouthful) ensures that CD writing is smooth, and the company claims you can record 650MB of data onto a CD-R in three minutes, while a CD-RW takes just under four. The unit is bundled with Nero Burning ROM, InCD and PowerDVD.

Sony CRX300A
VENDOR: Sony
PRICE: $169
PHONE: 1300 137 669
URL: www.sony.com.au

Photo printer for phones

As the resolution of cameras in mobile telephones becomes better and better, it seems only natural that consumers will increasingly want to print out photographs taken with their cameras. FujiFilm has answered this call with a photo printer designed for use with telephones. Users transmit their images via infrared to the NP-1 for printing, which operates at 254dpi. The unit measures around 11x10x4cm, making it portable, and two AA-batteries provide enough power for printing around 100 photos, said the company. FujiFilm has yet to decide on a launch date and price.

FujiFilm Cellphone Printer NP-1
VENDOR: FujiFilm
URL: www.fujifilm.co.jp
(Japanese)

Concept smart phones

Handspring's yet-to-be-released Treo 600 smart phones are sure to set tongues wagging this summer, combining all the functionalities of a phone with Palm's OS 5.0-based organiser. Featuring a fully integrated Qwerty keyboard, Graffiti handwriting recognition and T-9 text input facilities, catching up with friends and family has never been so easy. Although the phones aren't expected to hit the shelves until late September/early October you can be the first to get the details right now at the address below.

Handspring Treo 600 range
DISTRIBUTOR: Brightpoint
PRICE: $TBA
PHONE: 1300 300 213
URL: www.handspring.com/treo600

Portable notebook desk

Although perching your notebook on your lap is convenient, it does tend to wobble around and get uncomfortably hot on your legs! The Lapdesk is a lightweight, folding plastic platform that will keep your notebook in one place and your knees cool. It's more stable than you might think by looking at it, and the rubber grips keep the notebook very steady. The grooves let air circulate. Unfolded, there's enough room for accessories like mouse and external floppy drive; folded, it's great for airline seats or chairs with awkward arms. (Sony Vaio and accessories, pictured, not included in price.)

Targus Lapdesk
VENDOR: Targus
PRICE: $69.95
PHONE: 1800 641 645
URL: www.targus.com.au

Blistering image capture

Nikon's latest professional digital SLR still camera, the D2H, will certainly get the blood pumping in any serious photographer. The 4Mp resolution of the camera is nothing special, but other functions leave many consumer cameras in the dust. It can shoot up to eight continuous frames at full resolution in JPEG or RAW mode, and shutter lag — the time between pressing the shutter button and the shutter firing — is given as 37 milliseconds. Other functions, all with the time-conscious nature of news and sports photography in mind, include the ability to use the camera as soon as it is switched on. An optional wireless LAN adapter can transmit photos directly from the camera via an access point to a server. The camera will be available from late October.

Nikon D2H
DISTRIBUTOR: Maxwell
PRICE: $TBA
PHONE: (02) 9390 0200
URL: www.maxwell.com.au

The Cat's Meow

Takara — the people that brought the world the Bowlingual dog translator — have unveiled plans for a cat translator. The Meowlingual is still under development and few details are available. However, Tokyo-based Takara says it will have some of the same functions as the company's Bowlingual translator, including the ability to 'translate' cat calls into one of around 200 phrases that are displayed on a built-in LCD. Unlike the Bowlingual, it will be a single unit — a neck-worn microphone being judged impractical for cats.

It is due to go on sale in Japan next month and will cost ¥8800 (approx. $112).

Takara Meowlingual
VENDOR: Takara
URL: www.takaratoys.co.jp (Japanese)

Breed

BY SPENCER DALZIEL

Breed is a first-person shooter in which players can command an array of sci-fi vehicles. Its implementation gives it a different edge from Halo and it has some of the biggest playing fields we've ever seen. Breed is definitely one to watch for and could well be a surprise hit on its release.

The setup is simple. Humanity is under threat from an alien race known as the Breed, and Earth sends two motherships to retake some lost colonies on Mars. While this happens, the Breed have taken over Earth and started to terraform our planet to suit their requirements because they really are very, very naughty.

Naturally it is your job, with the help of five team-mates that can be individually controlled, to eradicate the Breed and save survivors using pretty much anything at your disposal.

The development team has included several features that make this game stand out. First, there's the seamless transition between the dropships in space and Earth — there's no ugly loading times. Second, the huge well-designed environments contain more than enough detail to compete with bigger developers' titles.

The artificial intelligence is particularly impressive for both your team-mates and the Breed. And there are innumerable ways to complete missions thanks to the wide array of weaponry and usable vehicles in the game, giving the player a certain amount of freedom.

The single-player missions were fun but you should really take Breed as the multiplayer entity. With so many types of vehicles and co-operative options to choose from, there's no doubt Breed will rock.

Publisher: CDV
Developer: Brat Designs
URL: www.cdv.de

CSI: Crime Scene Investigation

DEANNE MCINTOSH

We've seen game tie-ins from movies, so why not from a TV show? The program, CSI, set in Las Vegas, features a group of hip forensics investigators tackling crimes. Now, an adventure game will help you get a piece of the action.

In CSI: Crime Scene Investigation your role is rookie investigator. You join the overloaded team during the night shift and get straight on a case. The first, 'Inn and Out', serves as a walk-through of the game, giving a tutorial on how to collect clues using various tools and then complete your case. This orientation is a useful and simple way to get a handle on the game's features, but it becomes a little boring after a while, when all you want to do is get on with finding the killer. Get past this one, however, and you can go at your own pace through the following games.

In each case (there are five) you're paired with a member of the CSI team — and if you're a fan of the show, you'll be familiar with the characters: head of the department Gil Grissom, captain of the homicide division Jim Brass, and technicians like lab guy Greg Sanders, amongst others in the cast. The characters are voiced by the actors, which will be a bonus for fans.

To investigate a case you need to gather evidence, and the tools of the trade are at your disposal. Use Luminol to check for traces of blood or a UV light to get a better view of potential evidence, for example. Piece together the evidence, which you can examine in more detail at the CSI lab either with the help of Greg Sanders or using the department computer, with clues from the interrogation of witnesses. This is accomplished through lists of questions you can ask, so don't get carried away thinking you can go into a bad cop/good cop routine with your partner.

Once you've gathered enough evidence for means, motive and opportunity, you can turn the case over to Jim Brass. Then you'll face an assessment from Grissom (remember, as a rookie you're trying to impress). Your rating will be based on how much evidence you collected and whether you had to ask for help from your partner (points are deducted for hints). You can replay the game to find more clues and better your performance rating.

CSI: Crime Scene Investigation, with its simple learning curve, will be appealing to fans of the show as well as crime/thriller enthusiasts. Adventure game enthusiasts may, however, find the pacing too slow and the clue gathering (running your mouse over the scene to find hotspots) and progress of the game a little unchallenging.

Developer: 369 Interactive
Publisher: Ubi Soft
URL: www.ubi.com/US/Games/csi

Hulk

BY BEN CAMM-JONES

Everyone loses their temper from time to time, but Dr Bruce Banner seems to have a shorter fuse than most. Getting hacked off causes a freakish transformation in him that makes Mr Hyde look like a fluffy bunny rabbit.

Originally a comic book, The Incredible Hulk was also a successful television series, and this game has been timed to coincide with the release of the movie. It's not just available on the PC, either, with PlayStation 2, GameCube and Xbox versions due for release. However, Hulk is best suited to console gameplay. If you want to play it on the PC you'll need a decent joypad or joystick, because trying to control Bruce Banner or the Hulk with the keyboard is near impossible.

Hulk is a huge game — it spans three discs — and if you persevere with it you will find hours of entertainment. Sadly, it isn't of the highest quality. The graphics

aren't particularly stunning, either, with developer Vivendi Universal keeping the original comic book animation style. I guess this title will please the purists, but if you're after lifelike visuals then this isn't going to do it for you — expect ridiculous plotlines and naff-looking baddies.

Overall, Hulk is difficult to play, visually disappointing — there were better-looking games on the market five years ago — and it's a bit boring. If you insist on buying this game, then get the console version rather than the PC title.

PC

Colin McRae Rally 3
BY SIMON EASTERMAN

This latest version of the standard-setting rally game has been eagerly awaited by virtual racing aficionados, and rightly so. Colin McRae Rally 3 provides an exhilarating dirt-track experience with the best physics, finest car detail and hardest challenges. If you can beat the rest of the field in this championship then you will rightly feel like the best driver in the world, although personally I can only dimly imagine what that pleasure might feel like.

Colin McRae Rally gives you the top job of driving a Ford Focus through the gruelling course of an entire world rally championship. Perhaps the only unrealistic element of the game is that any old incompetent (like me, for example) is shoehorned into this demanding position. Otherwise, the simulation is remarkable.

In each country you must complete three stages in a day, which leaves your backup team little time to repair the damage you've inflicted on your beleaguered vehicle before you're off again. You can easily end up crawling over the finishing line with several minutes to make up on the next stage. In one of my early attempts I limped

home backwards on three wheels. Early retirement beckoned.

The driving experience in this version is as exciting as ever. The simplest set of key commands puts you in control of an entirely convincing high-precision, souped-up skid-mobile that will, if you're good enough, stick to any road, track or path you throw it at.

And you are pitched against a dazzling array of terrains. Just running through the single-stage practice courses, you are forced to deal in quick succession with tarmac, gravel, mud, grass, snow and everything in between.

Luckily, sticking with you through rough and smooth is your navigator Nicky Grist. The implacable Welshman informs you of the approaching curves and pitfalls, patiently repeating his commands when you've gone round in a circle and are approaching a bend for the second time.

As far as the rest of the Ford team goes, you have the support of the best mechanics the multinational can buy. They'll patch you up as best as humanly possible after each punishing stage and give you an impressive range of car options, too.

For the thinking rally driver (if there's such a thing) the various brake strengths, suspension types, steering qualities and power balances add another dimension to your campaign and a chance to shave precious seconds off your time. There are also telemetry readings, which compare speed to revs and gear changes, so you can work out what's working in, or missing from, your performance.

Alternatively, you can throw yourself into it and enjoy the ride. Watching the bonnet fly off and your chances of raising the cup dwindle, you'll still have a great race. That's the beauty of the game — all levels of prowess and clumsy hopelessness are catered for (though I can only vouch for the latter).

As much or as little as you bring to the table, you'll be rewarded with an engrossing and addictive game. Completing each stage unlocks further functions, which is an incentive to the dullards and means the pros are less likely to get bored. At the end of the day, though, it's the driving action that keeps you going. Or, in my case, the simple desire not to be the worst-ever performer on international rally driving.

PC PREVIEW

Day of Defeat
BY SPENCER DALZIEL

On a first-look basis there are several reasons why you shouldn't buy Day of Defeat. It's yet another action shooter set during World War II, it's based on a graphics engine that's four years old and, lastly, you can download it for free online. However, look beyond this cursory inspection and you'll notice Day of Defeat offers some of the best gameplay you've seen for a long time.

Like the hugely popular CounterStrike, Day of Defeat started life as a home-brew modification of Half-Life. It became such an online success that Activision decided to knock it out as a separate retail game. It's worth buying because you don't need the original Half-Life and there are some additional professional touches such as better skins, volumetric fogging and a brilliant array of sound effects.

The game is an online-only experience that pits Axis against Allied with heavy emphasis on team-based play, and here it really shines against its newer peers. Day of Defeat simply oozes gripping gameplay.

Playing couldn't be easier. There are several classes of soldier to pick from, each with a different set of weapons, and this affects your tactics in the game. Running around like a headless chicken with a gun will get you nowhere.

When you jump or run not only do you get tired but you also can't use your gun, which leads to more strategic gameplay. If you have a microphone you'll see built-in support for voice communication, which becomes an essential requirement once you've mastered the basics.

Sure, it looks a little dated. But you don't need a powerful system to play Day of Defeat in its full glory and it only requires 535MB of hard disk space. ■

spam of the month

Mrs Backbytes concurs that this is the best piece of spam in the PC World cupboard at the moment. Could someone please teach the Americans to say 'bum'?

Is your poop shoot killing you?

We're lonely and want your gossip and everyday technology weirdness — e-mail to dr_backbytes@hotmail.com

Blue boy's club

You're 39 years old, male, you have $US1.7 billion and you need a hobby. Polo? A game of bridge, which is Bill Gates's idea of fun? No, let's try space tourism!

Yes, you are Jeff Bezos, founder of Amazon and a man on a mission to make big rockets and send paying citizens into suborbital space. It's all very secretive, with Bezos's very own space company, Blue Origin, not even having a listed telephone number. Bezos himself explains: "It's way premature for Blue Origin to say or comment on anything because we haven't done anything worthy of comment." (We know a few politicians who should adopt this approach.)

The company's one-page Web site notes that the company needs systems engineers familiar with "failure modes and effects analysis" and other encouraging skills, but discourages pretenders — "We are building real hardware," says Blue Origin, "not PowerPoint presentations." Ooh, that hurts.

The Boys Own secretiveness of Blue Origin is interesting but we think the best story is the involvement in the company of Bezos's mate, Neal

Not a picture of Jeff Bezos posing with a tall friend.

Stephenson, author of sci-fi classics *Snow Crash* and *Cryptonomicon*. His role was attracting enough attention to warrant Stephenson issuing a statement explaining what he was up to. Apparently his writing improves when he spends "some time each day doing something completely unrelated to writing books". To date, this has been boat-building, writing computer code (VERY relaxing), and tinkering with electronic circuits and model rockets. Now he can get his hands on the real thing at Blue Origin. "I make myself useful there when and where possible," says Stephenson.

He's bad

Rabid music downloaders have a friend in Michael Jackson. When US lawmakers introduced legislation to make downloading of copyrighted material punishable by a jail sentence, the King of Pop apparently became "speechless" (but spoke out anyway).

"It is wrong to illegally download, but the answer cannot be jail," said Jacko. "Here in America we create new opportunities out of adversity, not punitive laws… This way, innovation continues to be the hallmark of America."

Backbytes can't quite fathom that the little curly-headed kid with the silky moves is now 44 years old. And he probably can't fathom that his latest CD cost $US30 million to produce but has only made $US5 million in sales.

"It is the fans that drive the success of the music business," says Jackson. It certainly isn't Michael Jackson anymore.

Buy cable tags, buy cable tags…

We love the data-nest of cables behind our PC, a wonderful unsortable mess of warmth and purpose. Backbytes wouldn't stoop (literally) to untangle and label that mess, so we can't share the horror of the tenants aboard the International Space Station. Astronaut Ed Lu was undertaking Space Station-y duties when he noticed a 6cm-long piece of metal drift pass the porthole, apparently a label from an external power or data cable. Ed identified the culprit after his helpful buddies down in Houston e-mailed him pics to choose from. The labels are normally attached to the cables with woven fibreglass lacing cord, but it seems some little NASA boy-scout never got his badge for knot-tying. ■

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